THE DENTAL PRACTITIONER

monthly journal for the Practitioner and his Staff

VOL. III, NO. 1 SEPTEMBER, 1952

Incorporating the Official Supplement of
The Dental Laboratories Section of the Surgical Instrument Manufacturers' Association

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THE DENTAL PRACTITIONER

A Monthly Journal for the Practitioner and his Staff

(*Incorporating the Proceedings of the British Society of Periodontology and the Official Supplement of the S.I.M.A.—Dental Laboratories Section*)

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Manuscript should preferably be typewritten with double spacing and wide margins, and the author should keep a copy. Articles and their illustrations become the property of *The Dental Practitioner*, unless authors reserve the right before publication.

Illustrations should be clearly numbered and legends should be written on a separate sheet of paper and not put on the backs of the originals. Each figure should be referred to in the text. Prints are preferred to X-ray negatives and should be on glossy paper. Lettering which is to appear on illustrations is best shown on an overlay or rough sketch. It should not be put on the original.

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References to dental literature should be recorded in the text, with the name of the author and the year of publication in parentheses. In the bibliography they should be arranged in alphabetical order in the following form, the abbreviations of periodicals being those adopted in the *World List of Scientific Periodicals*, e.g. :—

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THE
DENTAL PRACTITIONER
A Monthly Journal for the Practitioner and his Staff

Vol. III, No. 1 September, 1952

EDITORIAL

ACHIEVEMENT

THE DENTAL PRACTITIONER enters its third year of publication this month, and on this anniversary we should like to thank all our readers and contributors for the way they have helped to keep up the standard of the journal. In these days when abuse is all too common and often unwarranted, it is easy to join the mob and to find fault with everything around us. Fortunately, the quality of material sent for publication has been high and the rejection slips have been negligible. However, a journal is made up of material supplied by its readers and there must be a tremendous store of ideas and ideals in the minds of practitioners that could be worthily published. An appeal is made to all of you to let us have the results of your clinical experience. Many new ideas arise undoubtedly from the influence of other men, but this does not detract from their worth. All walks of life, and indeed all progress, are affected by the influence of the past. The great may die, but their thoughts and accomplishments live on and affect the daily lives of each one of us. The highly successful International Congress is now past, but its passing has raised the status of the dental profession in this country and its influence on British dentistry will remain for a long time. The organizers of the Congress are to be congratulated and they can look back with pride on their handiwork. The general practitioner, too, working quietly in his surgery and laboratory, should be able to add some new idea for the general good of the profession, and then be able to look back and say with satisfaction that it was he that influenced some new trend in dentistry. This is not a myth, but a solid fact. Nearly all the great inventions and discoveries have started in some small way and then risen to great heights with the help of others. We ask you, with your background of clinical experience, to help in a small way the forward march of dentistry.

RISING COSTS

With rapidly rising costs, the publication of a professional journal becomes more difficult each month. May we therefore ask in all sincerity that subscriptions be renewed for the next volume as soon as they become due. It would be of very great help in our efforts to maintain the high standard of the DENTAL PRACTITIONER if every reader would obtain another member of the profession as a subscriber.

PLANNING AND DESIGN OF REMOVABLE PARTIAL DENTURES*

By **COLONEL ARTHUR H. SCHMIDT**, U.S.A.F.R. (D.C.)

Formerly Professor and Chairman of the Prosthetic Department, College of Dentistry, University of Nebraska, Lincoln, Nebraska. Now Chief of the Prosthetic Department and in charge of the Prosthetic Laboratory—United States Air Force Hospital, Wiesbaden, Germany.

THE field of removable partial denture construction presents numerous problems that have challenged the ingenuity of some of the finest minds in dentistry. Many outstanding men have contributed to progress in this field. On the whole, this progress has been empiric rather than scientific. Removable partial denture construction does not readily lend itself to scientific methods of study because of :—

a. The infinite variety of patients;

b. Their different states of health;

c. The multitudinous methods of treatment and construction available; and

d. The length of time needed, usually years of periodic observation, before scientific conclusions can be drawn.

Likewise, there remains the difficulty, if not impossibility, of obtaining an adequate number of control patients to check the results of one method of treatment against those of other methods. Although some scientific work has been done on removable partial dentures, this has been the exception. When success is measured by the ability to make restorations that function over a period of ten or more years, without damage to the remaining teeth and their investing tissues, it must be clear that this work is based on practical rather than truly scientific method.

This explains why, with few exceptions, improvement has come about through trial and error. Although it is impossible to standardize procedures in a manner to fit all modifications, certain principles of design are fundamental. If removable partial dentures are to become a part of dental health service, much of the confusion now existing must be resolved. The student, undergraduate, or graduate, is bewildered by the multiplicity of attachments, clasps, stress breakers, tooth types, and the large number of technical procedures, all of which are claimed by their sponsors to be panaceas for some specific type of condition. As a result of this situation most dentists are accepting the removable partial denture as a short intermediate step to full dentures and are delegating the greater part of the problem to the commercial laboratory. These laboratories at best can only provide a solution to part of the engineering side of the problem. All too frequently the appliances designed and made by laboratories are more harmful to the patient than the conditions they are supposed to correct. The laboratory technician's responsibility begins and ends with fitting a denture to a master cast made from an impression taken by a dentist and articulating the denture according to an occlusal registration furnished by the dentist. This limited responsibility does not mean that the laboratory technician should have no concern for the interests of his clients. On the contrary, he should learn the biological factors involved in restorative dentistry.

Many of us interested in the teaching of removable partial denture prosthesis to undergraduates have felt the need of a better understanding of the principles involved. Recognizing the impossibility of giving students a solution for each problem that may arise, we have been forced to stress basic principles, which, if applied with judgement based on clinical experience, could aid the student in solving most of the problems commonly encountered. It is a human failing to pass lightly over abstract principles and to stress concrete

* The text is reprinted by permission from the *U.S. Armed Forces Medical Journal* (1950), December. The illustrations have been produced from slides shown by the author when lecturing on this subject to the Institute of British Surgical Technicians at the Eastman Dental Clinic, Feb. 20, 1951.

details. The basic principles* of removable partial denture prosthesis are:—

1. Dentists must have a working knowledge of both the mechanical and the biologic factors involved in removable partial denture design and construction.

2. Any plan of restoration must be based on a complete examination and diagnosis of the individual case.

3. The dentist, not the technician, should correlate the pertinent factors and recommend a proper plan of treatment.

4. A removable partial denture should restore form and function without injury to tissue.

5. A removable partial denture is a form of treatment, not a cure.

Principle 1.—In order that he may render adequate removable partial denture service, the dentist must have a knowledge of anatomy, histology, pathology, physiology, and biochemistry, as well as a working knowledge of many of the laws of physics and engineering, particularly those that apply to levers. He must be familiar with dental materials. He should keep abreast of scientific advances in both biologic and mechanical aspects of dentistry. The tradesman serves his time as an apprentice and spends the rest of his life performing that which he has learned. The professional man in his college receives a foundation and the privilege and opportunity to continue to learn. Because the student, alone, cannot gain the experience that is possible through a constant interchange of ideas in a large group, study clubs and professional societies are necessary. More dentists should ally themselves with these groups rather than practise dentistry as though it were a trade.

Principle 2.—A complete examination and diagnosis must be made before a removable partial denture can be designed. It is not sufficient merely to look into a patient's mouth and see that there are missing teeth. An appliance which may render good service for one patient might be contra-indicated for another, even though at first glance the two may seem to be similar. An examination for a prosthesis must be more comprehensive than that which is generally undertaken. We should know as much as possible about the mouth of the patient, and in most cases we should also know something of his general health, his bone structure, and his eating and hygienic habits.

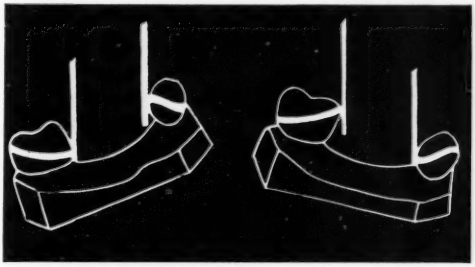

Fig. 1.—Considering the importance of the removable partial denture to the patient and to the dentist, it is surprising to find how many are made without adequate planning, because here lies the secret of all successful work, thorough planning of the finished appliance *before* any work is started on it. The dentist or technician needs a blueprint from which he can work just as surely as an engineer does.

Since the position of all clasps on the denture are fixed relative to each other, they must all seat along the same path of insertion. As they are all designed with the model set at the same fixed angle to the spindle, a common path of insertion is automatically established, the change of tilt reverses the undercut areas of the abutment teeth, thereby creating an entirely different clasp indication on each one.

An examination with roentgenograms is necessary for even the most simple removable partial denture. Study models, either mounted or unmounted, are desirable except in the simplest cases. Many dentists may think that the time spent making such an examination is largely wasted, but such a belief is short-sighted and poor economy. One failure caused by an improper plan of treatment based on an inadequate examination and diagnosis wastes more time than would be used in many hours of consultation and examination.

Principle 3.—The dentist should plan the treatment of these patients himself. The technician's function is to make raw materials into a finished removable partial denture. Although in this phase of the work he often

* The author expresses appreciation to George A. Hughes, D.D.S., for the basic principles of removable partial denture prosthesis.

becomes more skilled than the dentist himself, because of constant technical practice, the fabrication of the appliance is but one phase of the problem. The treatment of a patient requires more than a knowledge of mechanical factors and technical ability. It is frequently necessary for the dentist to institute preparatory or corrective procedures prior to the construction of a restorative appliance. Contours of teeth may require modification, occlusal relations may require improvements or surgical procedures may be necessary. The patient will accept such corrective procedures with much better grace if he is informed of the necessity of an adequate examination and diagnosis prior to the construction of an appliance. As the dentist alone may modify the conditions present in the mouth in order to influence the outcome, he, not the technician, should plan the treatment.

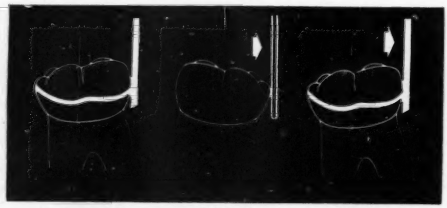

Fig. 2. *Fig.* 3. *Fig.* 4.

Fig. 2.—What is surveying? Reduced to its very simplest terms, surveying a tooth is a mechanical method of obtaining its height of contour accurately. The mathematical principle involved is easily understood. If a vertical plane is brought into contact with a curved surface, they will touch at the greatest bulge or convexity and nowhere else. Should the curved surface be rotated against the vertical plane, an imaginary line which represents the greatest circumference will result.

On a tooth, this line is the height of contour and is the guide line from which the correct position of the clasp is determined.

Fig. 3.—The location of the all-important height of contour on any abutment is easily found on the surveyor. When that location is known, the undercut areas are evident. In the preliminary analysis the abutment tooth is brought into contact with the metal analysing rod. The rod will contact the tooth at the greatest circumference and nowhere else.

Fig. 4.—If the analysing rod is now replaced with the carbon marker and the tooth rotated around the marker, a line will be drawn on the tooth, which represents the height of contour on that particular tooth. That line is the survey line.

Principle 4.—A removable partial denture should not injure remaining teeth or adjacent structures. It is essential to plan or design the restoration in accordance with biological laws governing the reactions of tissue. Sound principles of mechanics must also be followed in order that the appliance will function without undue alteration. The appliance must be carefully made so that it will go into its place without modification of the adjacent structures. The casts used in making removable partial dentures must be made from impressions which faithfully record the shape of the oral tissues.

The functions of a removable partial denture are:—

a. The restoration and preservation of occlusion impaired by loss of teeth;

b. The restoration and preservation of occlusion impaired by malposition of remaining teeth;

c. The preservation of the remaining teeth and alveolar ridges; and

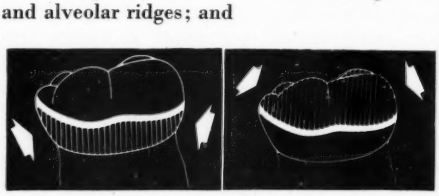

Fig. 5. *Fig.* 6.

Fig. 5.—All areas below the line, that is between the line and the gingiva of the tooth, are undercut areas (illustrated by hatching on this molar).

Fig. 6.—The non-undercut areas of the tooth are those above the survey line between it and the occlusion. The position of the clasp of the tooth is determined according to the location of these undercut and non-undercut areas, the exact location must, of necessity, be known before any planning of the denture can be started.

d. The restoration of a normal or desirable facial expression impaired by loss of teeth or closure of the bite.

A removable partial denture must be planned and constructed to fulfill these essential purposes with a minimum of interference with the tongue or enunciation and the least possible display of structural materials. The various parts of the base must be designed to provide an adequate mechanical counterbalance or resistance to the differently directed

forces or movements without interfering with any of the functions of a removable partial denture.

Saddles are supporting elements, one of their functions being to resist vertical masticatory pressure against the alveolar ridges. These flanges, resting against the lingual or labial sides of alveolar ridges, may provide bracing support against horizontal, lateral, or anteroposterior displacements. The stress of mastication must be resisted by an adequate support. When possible, tooth-borne support should be used, otherwise the size of the saddle must be increased in proportion to the stress exerted on it. When the size of the saddle cannot be increased sufficiently, the occlusal stress must be reduced in order that a satisfactory relation between pressure exerted and ability to resist such pressure is attained.

Removable partial dentures which depend on mucosa for support must not transmit this stress other than in a rootwise vertical direction to the abutment teeth. When the denture is displaced because of compression forces occasioned by the stress of mastication, tonguing strain must not be transmitted into the abutment teeth. These strains and stresses must either be minimized or eliminated by proper design of the retainer or some sort of stress-breaking action must be provided. Clasps are direct retainers whose function is to prevent the vertical dislodgement of the denture from its seat. Clasps may also serve as bracing supports to prevent the horizontal shifting of the denture or drifting or rotation of the teeth engaged by them. Direct retention by clasps is provided only for the ends of the saddles to which they are attached. When no anchor teeth are available at the other end, some means must be found to hold the saddles in their position against the ridges. This can be accomplished by extensions of the base to rest against the surfaces of the teeth on the opposite side of an axial line between the clasps. Such parts of a denture are known as indirect retainers.

Indirect retention as well as direct retention should be provided of all patients with distal extension in order to stabilize the appliance. Major connectors, such as palatal, lingual, or labial bars, serve the purpose of joining posterior saddles with each other, or in unilateral cases connecting the posterior saddle with an anchorage on the side of the arch opposite the saddle. Among these connecting elements must be included all the smaller bars

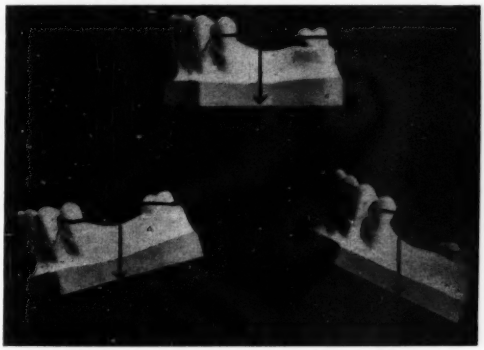

Fig. 7.—It is evident that, with various tilts, these lines change their position on the teeth, so that if a certain clasp were indicated on a molar because of the particular position of the undercut, that same clasp could not be used successfully on the same tooth if the tilt were changed, since this would cause a different type of undercut.

and struts that are employed to join nearby saddles, or to support or reinforce clasps or indirect retainers. Lingual and palatal bars should be so located that they will neither interfere with the comfort nor the speech of the patient. The palatal bar should be located in about the same position as the distal border of a complete denture, crossing the palate distal to the second molars.

Independent lateral action of saddles should be prevented. The use of too light a lingual or palatal bar allows an independent action of saddles, rotating about the ridge crest as a centre. The stress of mastication in causing this rotation places great pressure on the buccal and lingual peripheries of the saddle. Soreness in these areas may result and the dentist frequently is forced to trim away the saddle, thus reducing the much needed support. Bars joining saddles, and lingual bars in particular, must be of sufficient strength to prevent torsion of saddles. Stabilization is not merely a matter of vertical support and vertical retention. It is

a problem of anchoring a denture to prevent displacement from its functional position by forces that act on it horizontally as well as vertically.

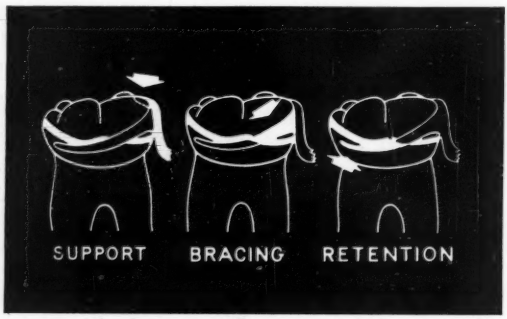

Fig. 8.—In order to understand the basic principles of clasp design, let us first see what the essential functions of a clasp are. Every clasp on a denture supplies a definite amount to the over-all support, bracing, and retention required for the success of the partial.

A, This clasp provides support because of its occlusal rest at the rigid portion of the clasp above the surveyed line. It is the mechanical function which prevents tissueward movement of a partial denture, supplied primarily by well-designed occlusal rests on all abutment teeth.

B, Bracing is supplied by the rigid body portion of the clasp over the non-undercut part of the tooth. It is the mechanical function which prevents lateral shifting or movement of a removable partial denture and supplied chiefly by the rigid portions of the clasps.

C, Retention is provided by the flexible arms of tips engaging an undercut below the survey line, which prevents the dislodgement of the removable partial denture.

As mentioned before, it is essential in planning any removable, to consider the sum total of support, bracing, and retention provided by all clasps on the appliance. The denture must be planned as a unit.

Tooth rests, sometimes called "stops" or "rest lugs" are intended to resist the movement of a denture by vertical masticatory pressure. In addition to vertical support of the denture in its functional position they also (*a*) are an important aid to the retentive capacity of clasps, by helping to keep the clasp terminals in their proper positions; (*b*) prevent impingement of the cervical edges of clasps against the gingival margins of anchor teeth; and (*c*) prevent the impingement of the extremities of saddles against tissues adjacent to the gingival margins.

Each tooth adjacent to an edentulous area should carry a tooth-rest, whether it is clasped or not. As direct retainers, clasps secure against vertical displacement those parts of a denture to which they are directly attached, and depend for their effectiveness on (*a*) the contours of the crowns of the anchor teeth, or the angles at which they lean towards or away from each other, and (*b*) the physical properties of the clasp metal. In order to provide retention, one or both of the terminals or arms of a clasp must be elastic enough to spread open and pass the opposing projections created by the contours of the anchor teeth and then close

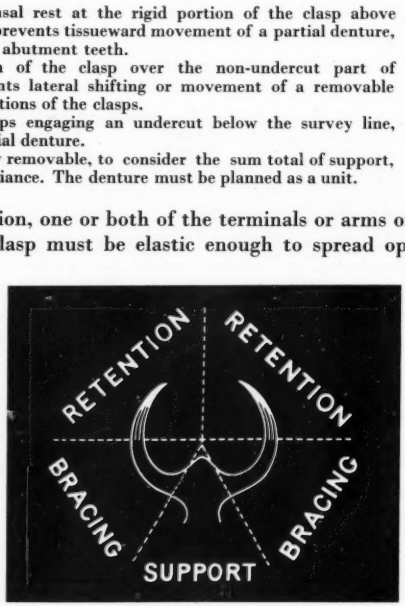

Fig. 9.—Each section provides its own function; they are not interchangeable. An occlusal rest will not provide retention. The flexible tip will not provide bracing. Nor can the rigid section be used for retention.

about the undercut. This spreading is greatest at the free ends of terminals and gradually diminishes to nothing where the clasp is joined to the base of the denture. To locate these undercuts and determine the most favourable areas for retention, the master cast should be surveyed. Clasp guide lines should be charted with a surveying instrument. The guide line defines the limits of projection on the contour of the proposed anchor teeth and indicates the position of retention undercuts. The position of the guide line and, therefore, of the clasps can be changed by varying the angle at which the cast is tilted. The angle of the cast determines the path of insertion of the denture to make it easy to seat and remove from the mouth, in a direction parallel to the vertical mandrel of the surveyor.

Principle 5.—A removable partial denture is a form of treatment rather than a cure. As with any other treatment, it should be planned in accordance with the conditions of the particular case; it should be individualized and must be modified from time to time in order to suit changing conditions. The denture itself is subject to wear and breakage. The oral tissues never remain the same but are constantly changing, hence the patient must be periodically recalled in order to prevent or rectify (deleterious) changes that may take place. In the construction of a removable partial denture simplicity should be a byword. The simpler the appliance, the less need for adjustment and repair. The appliance should be so designed and constructed that it may be modified to compensate for changes in the thickness of mucosa or alveolar resorption.

CONCLUSIONS

The planning and designing of a removable partial denture is a responsibility of the dentist and should not be delegated to any other person. The dentist engaged in making such restorations must have a knowledge of the biologic and mechanical factors involved, and and he must continuously augment his knowledge. This type of prosthesis is treatment and should be planned in accordance with the conditions peculiar to the patient. This requires more than a knowledge of mechanical factors and technical ability. Plan—design—construct—that idea is the basis for all successful removable partial dentures. The principle of surveying, the significance of the survey line, the relation of the clasp to the survey line, and the opportunity presented by tilting the model to control the location of undercuts are basic factors which will enable you to solve any removable partial denture problem.

Finally, six reminders for good removable partial dentures:—

1. A thorough, general examination of the mouth with roentgenograms.
2. A thorough prophylaxis and treatment of and removal of questionable teeth.
3. Repair all carious lesions.
4. Obtain preliminary impression and study casts, and articulate them.
5. Draw tentative design on study casts, prepare occlusal rests, and teeth by grinding.
6. Obtain accurate impression after teeth are prepared.

This presentation of photographs will stress fundamentals, explaining the use of the undercut gauges in determining the position of clasp tips for retention and for tilting.

Also showing the practical application of the clasping principles, waxing of various cases, and showing finished castings and dentures.

Credit is due to the following men for their many ideas and contributions to this work: Drs. U. L. Steffel; C. H. Schuyler, M. M. DeVan; L. G. Jordan; R. L. Girardot and George A. Hughes.

We are also indebted to the Ney Company of Hartford, Connecticut; the College of Dentistry, University of Nebraska; the Air Force Dental Service, the Photographic Reproduction Section, United States Air Force Hospital, Wiesbaden Military Post, for material used in the presentation.

The opinions or conclusions contained in this article are those of the author, and are not to be construed as official or reflecting the views of the United States Air Force or the Air Force service at large.

[*Further illustrations with full descriptive captions will appear in subsequent issues of the* DENTAL PRACTITIONER]

THE SURVEYOR IN EVERYDAY PRACTICE

By **A. J. W. TURRELL**, L.D.S.

Senior Lecturer in Dental Mechanics and Prosthetics, School of Dental Surgery, University of Sheffield

THERE have been several papers written on the dental surveyor (which is invariably referred to as the Clasp Surveyor), but these articles, admirable though they are, tend to give the impression that the surveyor is of use only in the construction of metal-based partial dentures.

In these days of State Dentistry the material most commonly employed of necessity, if not by choice, is methyl methacrylate resin, and the writer has formed the opinion that most practitioners regard the surveyor as not being applicable when resin is to be the base. Further, the term "clasp surveyor" is misleading, for it does suggest that the instrument is used primarily for the surveying of clasps, which, though an essential part of the technique, is by no means the only factor to be considered when "surveying" a model. The writer hopes the above reasons will serve as sufficient justification for yet another "Surveying" article in the dental press.

There are three accepted methods employed in the construction of partial dentures, dependent upon whether the impression material used be compound, reversible or irreversible colloid, or a combination of the compound with one of the latter used as a "wash".

It is well known that compound does not reproduce the undercuts faithfully, and their obliteration by drag on withdrawal of the impression permits the completed partial denture to be inserted without much difficulty. There is no laborious chairside grinding before the denture is seated, and for this reason compound is widely used in practice. However, there are four main objections to this method: (1) The degree of flow or drag of compound to remove undercuts is not under the complete control of the operator, no matter how great his skill with the material. (2) The undercut areas are still present in the mouth, creating spaces between the denture and the teeth. Such spaces are best avoided as they are stagnation areas. (3) The clasps are placed on the teeth without regard to the greatest contour of those teeth, for drag often obliterates any fine undercut areas which they may possess. It is now a well-established fact that the *retention* derived from any clasp depends entirely upon the flexible arms passing on to an undercut area of the tooth. When the flexible arms fail to engage an undercut their chief function is that of *bracing* against lateral stresses. There is only frictional contact present to resist downward displacement of the upper denture, and upward displacement of the lower. (4) Each clasped tooth is regarded as a single unit, with complete disregard of one for another. To perform their task correctly, and with maximum efficiency, all the clasps should be positioned so as to function in harmony. This positioning of the clasps can only be determined on a surveyor.

When a colloidal impression material is used, any undercut, whether it be fine or gross, is accurately reproduced. A denture constructed on such a model could not be inserted into the mouth until the undercuts had been ground away to approximately the same extent as they were "dragged" when the compound was used. The remarks above concerning the clasps are also applicable here. The end-result is the same as before regarding the stagnation areas and the position of the clasps, but valuable chairside time has been lost in addition.

Finally, there is the method of surveying the model produced from a colloidal impression. First, the path or angle of insertion is determined, then the greatest circumferences of the teeth to be clasped are marked at that particular path of insertion, and lastly undesirable undercuts are located, blocked out, and ultimately *enclosed* by an extension of the *base*, thus preventing stagnation areas.

FACTORS WHICH MUST BE TAKEN INTO CONSIDERATION WHEN DECIDING UPON THE INTENDED PATH OF INSERTION

Whenever possible a strictly vertical path of insertion should be avoided. When such a path is chosen dentures are more readily dislodged by sticky foods during mastication.

Anterior Undercuts.—These undercuts are always the first to be considered, for a stagnation area in the front of the mouth is often a source of embarrassment to the patient and others. Food debris caught between the natural and artificial teeth during meals may not be detected by the patient, or if it should be, is often wedged so firmly as to resist the searching action of the tongue to dislodge it. Whenever possible such undercuts are "transferred" to the posterior aspects of the denture. Naturally, the adjacent artificial tooth need not be placed at an acute angle to occupy such an undercut, but may be placed at the desired inclination, any interdental space left being filled by the base material to form an artificial interdental gum papilla. The tilt given to the denture by the inserting angle of choice will permit the papilla to be slipped under the undercut.

Guide Lines.—These are the carbon lines drawn around the greatest circumference of a tooth for that particular path of insertion.

The vertical analysing rod will indicate the guide line when passed round those teeth which, on account of their position and soundness, are considered to be ideal for the clasps. If the analysing rod indicates that the guide line will be too close to the gingival margin to permit the use of even a round wire clasp, then the path of insertion will have to be altered to bring the guide line to a more suitable position. Unfortunately, if the clasping tooth is on the opposite side of the model to an anterior tooth, the mesial undercut of which had been removed by the original tilt, then a compromised tilt must be reached with reluctance, for the new tilt will reproduce partly or wholly the original stagnation area* in the front of the mouth. Before becoming resigned to accepting the anterior stagnation area it is advisable to try raising the guide line on the model by an anteroposterior tilt, or vice versa, which will not affect the anterior undercuts. If the anterior undercut is rendered very gross in order to produce a favourable guide line, another tooth may have to be considered for clasping, but if there is not one available, the compromise tilt will have to be accepted.

Clasps should be placed in the least conspicuous position in the mouth, which indicates that not only must they be confined to the back of the mouth whenever possible, but their position on the teeth should be close to the gingival margin, though not so close as to hold food debris between it and the clasp.

It must be remembered that if no space is revealed between the point of contact of the analysing rod on the tooth and the gingival margin, there is no undercut present and therefore no *retention* is to be derived from that tooth. Further, wire clasps are the most flexible type, and will open over the greatest contour of a tooth, then close, ideally, to their "rest" diameter when passed beyond it. Therefore, should the rod indicate that the guide line when drawn will be at the other extreme of the tooth to the gingival margin, i.e., in the "occlusal" third, retention will be readily obtained.

Under these circumstances, the degree of flexibility of the wire used will determine in what depth of the undercut it can be placed without producing too much strain on the tooth during insertion and removal of the appliance.

The Ney Surveyor book describes an analysing rod which measures the amount of undercut present and indicates the type of clasp which should be employed on teeth having various degrees of undercut.

Extension of the Base Material to enclose Undercuts and thus prevent Stagnation Areas.—The base material of the denture is extended partly over the labial and buccal aspects of the teeth to a point where the undercut terminates, thus enclosing the undercut and preventing food debris from entering and packing into the space between the denture and the

* "Stagnation area" because, for æsthetic reasons, the undercut cannot be enclosed satisfactorily by the base material.

natural tooth. If the chosen path of insertion brings this terminating line too far buccally or labially round a tooth which is situated towards the front of the mouth, so that it is liable to be conspicuous, the angle will have to be modified to overcome this fault, i.e., the model so tilted that the undercut terminates more posteriorly. Of course, it sometimes happens that this ideal is impossible to attain, and some space between the base and natural tooth will have to be accepted. However, such a space can be reduced to a minimum and will be far less than that found in a denture which has not been surveyed.

Posterior Undercuts.—If a particular chosen path of insertion increases undercuts posteriorly to such an extent as to reduce considerably the area of contact on the alveolar process of a small posterior saddle, then a compromise will have to be reached between the ideal path of insertion which eliminates undercuts in anterior teeth together with a good guide line, and a path which will produce a greater area of contact for the posterior saddle.

Mesial and Distal Anterior Undercuts and their Influence on Buccal and Lingual Undercuts Posteriorly.—Careful study of a model mounted on a surveyor will indicate the following points:—

Mesial undercuts on the right of the centre line in anterior teeth are eliminated by a lateral tilt of the surveying table down to the right. (To avoid confusion between upper and lower, "left" and "right', refer to the operator's left and right as he regards the model on the surveying table with the anterior region towards him.) This will *decrease* or eliminate lingual undercuts on all teeth on the right, but will increase or produce all buccal undercuts on that side. It will place the guide line more towards the occlusal surface. On the left side lingual undercuts will be increased or produced, but buccal undercuts will be reduced. The guide line will be placed more towards the gingival.

Naturally the reverse is applicable when considering the tilt required to eliminate or reduce mesial undercuts of anterior teeth to the left of the median line.

The tilt required to eliminate or reduce distal undercuts of anterior teeth to the right of the median line, influences lingual and buccal undercuts in the same way as does the tilt required to contend with the *mesial* undercuts to the *left* of the median line. Again, the reverse is applicable when the distal undercuts on anterior teeth to the left of the median line are considered.

Mesial and Distal Undercuts formed by Posterior Teeth and their Influence Anteriorly.—When the model is viewed from the right side and given a tilt to the posterior—i.e., the molar area of the model is depressed—any undercuts mesially to the premolars and molars will be reduced or eliminated, and undercuts distally to these teeth will be produced, or if present, increased. On the other hand, an anterior tilt will produce or increase mesial undercuts and decrease or eliminate distal undercuts.

The canine will be influenced by a true anteroposterior tilt if it is in line with the posterior teeth. Whereas such a tilt does not usually influence undercuts in the other anterior teeth, a combined anteroposterior and lateral tilt may be required to eliminate abnormally twisted teeth.

Eliminating Gross Undesirable Undercuts by applying Kaffir D Plaster.—All partial dentures should be constructed on artificial stone models, and it is advantageous to have the model differing in colour from the stone which is to be used to block out the undercuts. Kaffir D is chosen for this purpose because of its setting time and its properties when set. The technique is almost identical with that described in the literature when "undercut wax" is used. Wax can only be used for blocking out the undesirable undercuts when a metal based denture is constructed, the metal base being extended to enclose the undercuts. When the base is to be wholly of resin or of the metal mesh variety embedded in resin, a material has to be selected which will retain its position in the undercut and its structure during wax elimination and polymerization of the resin.

Having decided upon the path of insertion and the teeth to be clasped, the carbon marker is passed round, not only the teeth which are

to bear the clasps, but also those teeth having undercuts requiring elimination. The extent of these undercuts towards the incisal or occlusal surfaces of the teeth is then indicated by the carbon mark, which should not be covered by the applied Kaffir D at the end of the blocking out process.

The Kaffir D is mixed like cement on a slab, a quantity sufficient only for one undercut being mixed at one time. The undercut area is saturated with water applied with a paint brush, and a creamy mix of Kaffir D conveyed on a small, bladed instrument is pressed firmly in contact with the tooth in the undercut area and built up to excess. Before it has set, the shank of a straight handpiece bur mounted in the surveyor arm is quickly passed through the Kaffir D until it contacts the tooth, when it is carried rapidly around it,

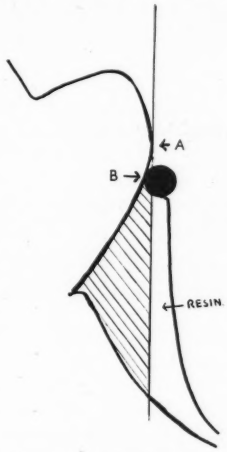

Fig. 1.—The diagram indicates the position of the lingual arm of the clasp (B) in relation to the guide line (A). Note the complete enclosure of the undercut area (shaded) by the resin and the clasp.

wiping off the excess Kaffir D before it. This is repeated until the carbon mark is again visible and the Kaffir D has been compressed into a compact smooth mass into the undercut. Until one acquires the knack, the process is difficult, and the Kaffir D will tend to break away if not applied at the correct consistency. Scratches cut with a fine, sharp point in the undercut area often aid in retaining the Kaffir D. It is advisable to use the rigid bur shank rather than the sharp cutting tool or the analysing rod provided with the surveyor, for there is a danger of cutting away the tooth structure where the sharp tool contacts the carbon mark, and the analysing rod is too

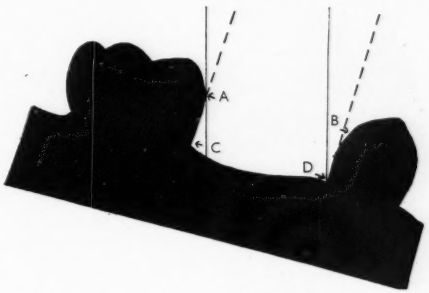

Fig. 2.—The diagram indicates when it is not necessary to eliminate undercuts. AB has to be equal to or greater than CD.

delicate for the purpose. The sharp instrument can be used to remove excess Kaffir D if this has been allowed to set inadvertently. When it is decided to construct clasps with a lingual arm, instead of utilizing the resin collar around the lingual aspect as the reciprocal force the Kaffir D must be carefully scraped away from the undercut below the guide line to a position where it is proposed to place the clasp arms. The resin collar must then *contact* the lower surface of the wire, or a stagnation area will result, but on no account should it be *fixed* to the wire to prevent its opening freely whilst passing over the guide line (*Fig.* 1).

Conditions where Undercuts need not be eliminated.—This is a comparatively rare occurrence, but when surveying the model it should not be overlooked.

When teeth situated anterior and posterior to a saddle area, or on the opposite sides of the mouth, are so inclined as to be parallel to one another, there is no need to remove the undercuts providing there are no other undercuts present elsewhere which prevent the path of insertion from being parallel to the inclined teeth (*Fig.* 2).

Tissue Undercuts.—Tissue undercuts must not be overlooked in the survey, and most of

the suggestions given for dealing with tooth undercuts can be applied. Whenever possible the path of insertion is adjusted so as to reduce

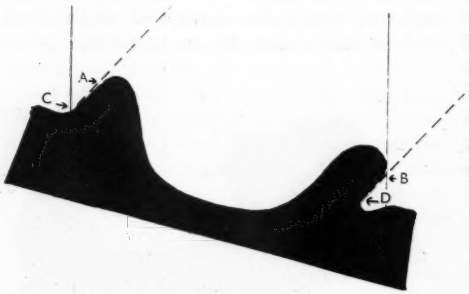

Fig. 3.—The diagram indicates when it is not necessary to eliminate undercuts. AB has to be equal to or greater than CD.

or eliminate them. For example, when a labial flange is required to restore lost contour any labial undercut will be reduced or eliminated by a posterior tilt. If reduction is the

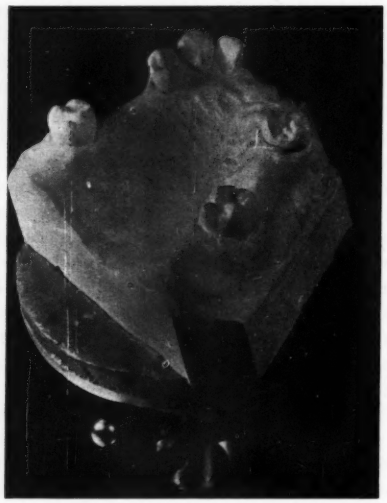

Fig. 4.—The model to be surveyed.

only possibility, an endeavour is made to select a path of insertion which will permit their being enclosed as for tooth undercuts, so as to prevent food from encroaching into them and packing under the flange of the denture. Kaffir D is packed into the undesirable undercut and excess removed with the bur shank mounted in the surveyor, as for tooth undercuts, though full elimination is not always required—the compressibility of the soft tissues can be taken into account.

Cases are occasionally met where these tissue undercuts will not require eliminating, as described for certain tooth undercuts—parallelism of the ridges on opposite sides of

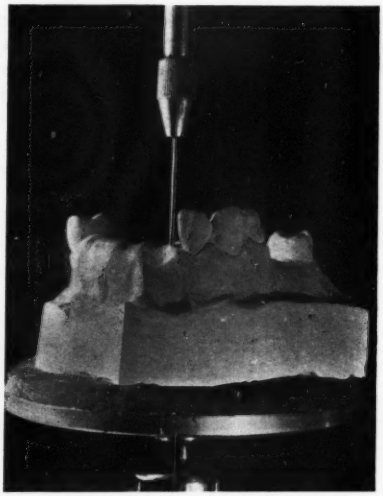

Fig. 5.—Showing the mesial undercut formed by the lateral at zero tilt.

the model for instance, *if the chosen path of insertion happens to coincide with the parallelism* (*Fig.* 3).

It is now proposed to take the reader through the surveying of the model shown in *Fig.* 4, step by step, in order to produce a tissue-covered denture using methyl methacrylate resin as the base material.

The base of the model is grooved with a coarse file and secured to the surveying table by a thin layer of composition. The table is given a zero tilt, and the vertical analysing rod is passed round the surface of those teeth against which the base material will make contact, and the undercuts—both tooth and tissue—are noted.

It will be seen in *Fig.* 5 that there is an undercut on the mesial surface of the right lateral incisor. There is no undercut on the mesial surface of the left bicuspid nor on its lingual surface (*Figs.* 6, 7). *Fig.* 6 shows an undercut on the distal aspect of the left premolar and one is also present on the mesial aspect of the left molar. There is no lingual undercut on this molar. Examination of the right-hand side of the model reveals a lingual

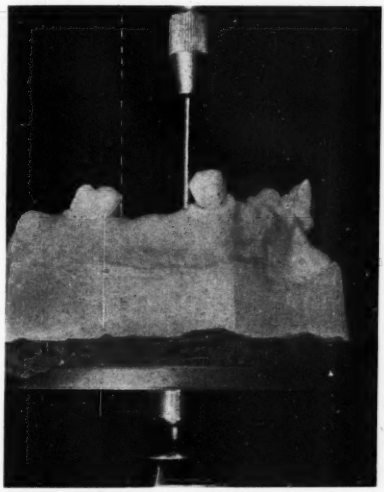

Fig. 6.—Showing the marked distal undercut formed by the left premolar, and the slight mesial undercut formed by the left molar at zero tilt.

undercut formed by the premolar, and a slight distal undercut (*Figs.* 7, 8). The right molar presents a mesial undercut but none lingually.

The first consideration, as previously mentioned, is the possible obliteration of the mesial undercut formed by the right lateral incisor. A tilt to the right will remove this undercut completely, as shown in *Fig.* 9. Such a tilt influences the lingual and buccal surfaces of all the teeth, and consequently there is a reduction in the lingual undercut of the right premolar with the formation of a slight undercut on the lingual aspect of the left premolar, though the molar still shows no undercut lingually.

Next we must consider the position of the guide lines on those teeth which are to carry the clasps, and also the amount the buccal

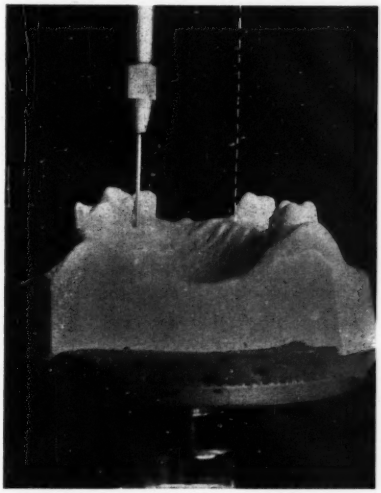

Fig. 7.—Showing the lingual undercut formed by the right premolar at zero tilt. The other posterior teeth form no undercut.

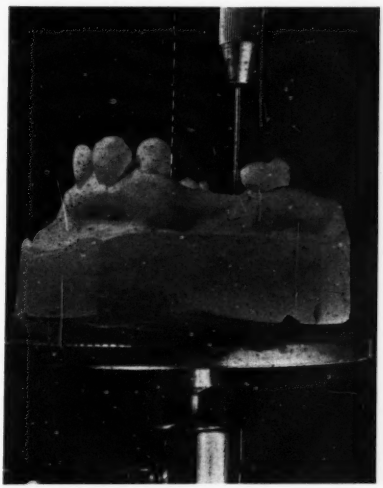

Fig. 8.—Showing the slight distal undercut formed by the right premolar and the more severe mesial undercut formed by the right molar at zero tilt.

flanges of the posterior saddles will have to be extended to enclose the undercuts.

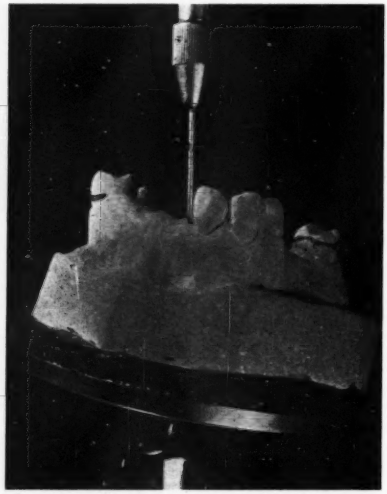

Fig. 9.—The model is tilted down to the right showing the elimination of the mesial undercut formed by the lateral. Note the low guide line on the premolar, and that on the molar.

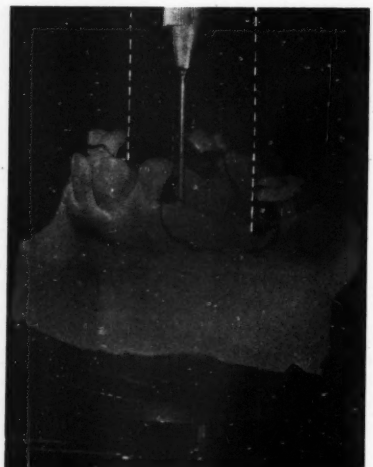

Fig. 11.—Shows the undercuts on the right side of the model after tilting as in *Fig.* 10. The outline of the saddle is shown. The shaded areas indicate the undercuts to be blocked out.

In this case it is decided to clasp the left premolar and the right molar. This path of

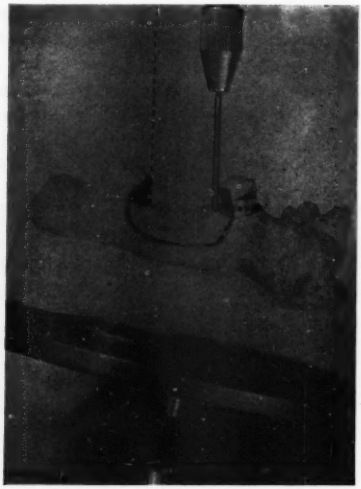

Fig. 10.—The model has been tilted to the right and downwards anteriorly. Note the decrease in the distal undercut formed by the premolar, and the slight increase of the molar undercut. The broken line indicates the original guide line prior to the model being tilted downwards anteriorly.

insertion will produce the guide lines on these teeth as shown partly in *Fig.* 9. It will be seen that the guide line on the left premolar is unsatisfactory anteriorly, whereas that on the right molar, though rather close to the occlusal surface, has excellent retentive properties.

The disto-buccal undercut formed by the tilt of the left premolar is very severe, and would compel an extensive buccal sweep of the denture flange to enclose it. Such a bulk of pink resin would be most conspicuous from the front of the mouth. A forward tilt to the surveying table reduces this undercut and incidentally that on the distal aspect of the right premolar, though it increases those on the mesial aspects of the molars to some extent.

The guide line on the left premolar is now favourable (*Fig.* 10). The amount of tilt given is such as to arrive at an effective compromise between the premolar undercuts and those produced by the mesial aspects of the

molars, also taking into account the guide lines on the teeth to be clasped (*Figs.* 10, 11).

The buccal flange will not have to extend so far anteriorly along the buccal surface of the premolar to enclose effectively the distal

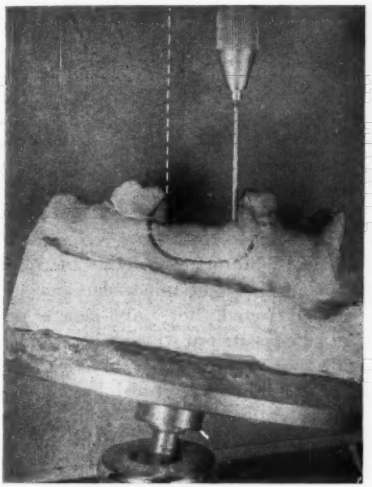

Fig. 12.—The elimination of the undercuts with Kaffir D as viewed from the left.

undercut and so will not be very conspicuous from the front of the mouth. The same condition is found on examining the right premolar.

This postero-anterior tilt has in no way reproduced an undercut on the mesial aspect of the right lateral incisor, and as the analysing rod, on being passed along the buccal aspects of the right and left saddle areas, indicates no severe tissue undercut, the carbon marker can be applied to the teeth to be clasped and also around the surfaces of all the teeth to come into frictional contact with the denture. These carbon marks will indicate the required depth of the collars around the teeth, the line to which the denture base will have to be extended buccally to enclose the undercuts and the extent of the undercuts to be filled in by the Kaffir D as previously described.

The completion of the survey can be seen in *Figs.* 12 and 13, where the undercuts have been eliminated with Kaffir D plaster.

It must be pointed out that some stagnation areas cannot be avoided, but they can be reduced to a minimum in the survey. For example, when constructing the molar clasp in the case described above, theoretically the

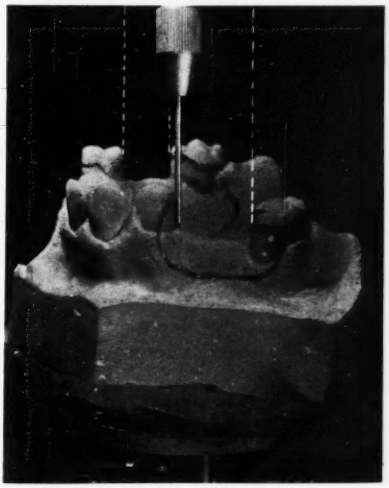

Fig. 13.—The elimination of the undercuts with Kaffir D as viewed from the right. (*N.B.* The model is tilted as in *Fig.* 12. The apparent horizontal position is caused by the angle at which the photograph was taken.)

undercut could only be entirely enclosed if the guide line contacted the gingival margin buccally (*Fig.* 14), but by the compromised tilting it is so arranged that only a thin layer of Kaffir D is required to fill in the undercut at the position indicated by the outline of the buccal flange, that is there will only be a slight space between the resin base and the tooth.

THE TIME FACTOR INVOLVED IN THE SURVEY

Many practitioners will maintain that the time taken to carry out the principles described is prohibitive, but the conscientious operator who always uses a colloidal material for his partial cases will appreciate the chair-time saved, and will enjoy the supreme satisfaction of a denture gliding into place with stagnation areas reduced to a minimum and clasps working in harmony. In the opinion of

the writer the patient is receiving an essential service, irrespective of the material used in the construction of the base.

The writer considers that the determination of the angle of insertion and the teeth to be clasped are the responsibility of the dentist, but the actual elimination of the undercuts with Kaffir D can be undertaken by the technician trained to appreciate the factors involved in the survey.

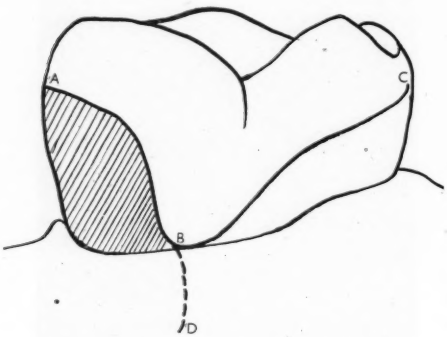

Fig. 14.—The diagram shows the type of guide line (ABC) necessary to permit the complete enclosure of an undercut. The shoulder of the clasp contacts AB, and the resin base will extend to ABD.

When the practitioner becomes fully conversant with the surveying technique he will regard the unsurveyed partial case not only as a very inferior restoration, but also as a mass of resin and porcelain which has to be carved away bit by bit before it can be seated, leaving large gaps between saddle and abutment tooth and frequently between artificial tooth and abutment tooth. Often clasps which have been carefully conformed to the teeth by the technician have to be bent away to ensure that they are not obstructing the seating of the denture.

Everyone has had to use, at times, a disk between the clasp and resin at the shoulder, to permit the clasp being bent away from an obstructing undercut.

With a careful surveying technique, and making due allowance for the inaccuracies arising from the uncertain behaviour of the material employed, not only can a partial denture be constructed which will reduce both chairside time and injury to the hard and soft tissues to a minimum, but also having secured the best retention available under the conditions presented, maximum functional efficiency is more certain of attainment.

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COMPOSITE ODONTOMA ASSOCIATED WITH CONGENITAL ABSENCE OF MAXILLARY LATERAL INCISOR

By **RICHARD SPITZER**, D.M.D.

ODONTOMA is a growth considered to be due to an interference of the normal odontogenesis (Stones, 1951; Fish, 1948). The true nature of the aetiology is, however, still unknown, as is the mode of action of the causative factor on the developing tooth. An interesting feature is that the growth is often linked with congenital absence of teeth.

CASE REPORT

The case reported is that of a girl, aged 11, who was referred for surgical exposure of the unerupted left maxillary canine for orthodontic purposes. On examination a small, painless, non-fluctuant swelling was found in the left upper buccal sulcus. The left maxillary lateral incisor was missing and could not be traced radiologically. The X-ray films further revealed numerous irregular radio-opaque particles close to the retained canine. (*Fig.* 1.)

Diagnosis: A provisional diagnosis of compound composite odontoma was made.

Therapy: On surgical exposure, the tumour was found lying within the alveolar process close to the canine, which was displaced towards the palatal aspect. The growth consisted of numerous small denticles. They were

Fig. 1.—Composite odontoma showing varying degrees of density preventing the eruption of the left upper canine.

dissected together with the surrounding sac and the crown of the canine fully exposed. The tooth was left in situ as its impaction was

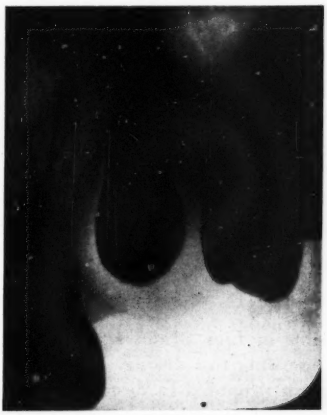

Fig. 2.—Canine in the stage of eruption.

considered to be due only to the presence of the odontoma.

Orthodontic treatment was carried out by Mr. K. Wongtschowski and the tooth has now, about 13 months after the operation, assumed its normal position. (*Figs.* 2, 3.)

SUMMARY

A case is described of a compound composite odontoma associated with developmental disturbance in the formation of the maxillary lateral incisor.

Fig. 3.—Canine in good alinement.

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SOUTH AFRICA CLAIMS THE HEALTHIEST TEETH IN THE WORLD

IN recent weeks South African doctors have investigated the health of the primitive peoples —Bakgalagadi, Hottentots, and Bushmen— living at Tsana in the heart of the Kalahari desert, and have come to the definite conclusion that these people have the healthiest teeth in the world. They live *almost exclusively off the land*, and are virtually independent of foodstuffs obtainable at the few isolated trading stores. Clinically, their general health is good with little evidence of deficiency disease.

This information was published in the annual report of the South African Council for Scientific and Industrial Research, after an investigation sponsored by the Council with the aid of Bechuanaland medical authorities.

THE REMOVAL AND REPLACEMENT OF AIR IN ENAMEL SPINDLES

By **J. J. HODSON**, L.D.S. R.C.S. Edin., B.D.S. Sheff.

Department of Oral Pathology, University of Sheffield

EXAMINATION of enamel spindles in ground longitudinal sections of teeth shows, amongst other features, three different appearances of their contents. Thus in *Fig.* 1 those at A

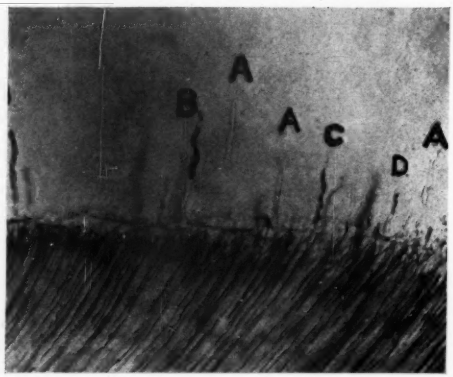

Fig. 1.—Enamel spindles in routinely prepared ground section—unstained—cleared and mounted in Canada balsam. (× 180.) A, Clear; B, Partly clear, partly black; C, Black.

appear clear or empty, those at B are partly clear and partly black, and those at C almost completely black.

It is generally accepted that the enamel spindles are expanded prolongations of dentinal tubules. It has been shown, however (Hodson, 1951), that there are two kinds of spindles, one due to prolongations of the dentinal fibres and one due to defects in amelogenesis. Some of the latter remain as hypocalcified areas and others as spaces which, during development, probably contained fluid (Hodson, 1952). The most common and distinctive types, which are frequently of some size, are due to defective amelogenesis. They can be seen with and without any connexion with the amelodentinal junction, some being found near the enamel surface. The types shown in *Fig.* 1 are spaces in the enamel due to defective amelogenesis. Dentinal "tubules" (fibres) may enter these spaces, as described by Mummery (1919). The linear structure seen in *Fig.* 2 may be a dentinal fibre. It will be noted, however, that this is

Fig. 2.—Higher magnification of area A–B in *Fig.* 1, showing air contents. X is probably a dentinal fibre. (× 640.)

not visible in *Figs.* 3 and 4, which may probably be owing to focusing.

It is not proposed to discuss here in detail the origin and structure of the enamel spindles, but rather to present a novelty, to prove the black appearances mentioned earlier are due to air which can be removed and replaced at will.

Fig. 2 is a higher power of the area A–B in *Fig.* 1 and shows two spindles with no discernible contents and one with a large and a small bubble of air. The margins of the bubbles are

closely adapted to the margins of the spindle. The section, which was previously prepared in the routine manner, was removed from the Canada balsam and returned to 80 per cent alcohol. It was then passed into 95 per cent

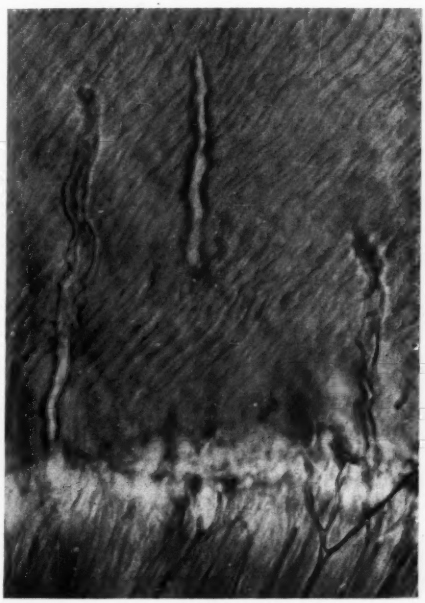

Fig. 3.—Same as preceding illustration, after removal of air.

absolute alcohol and xylol after a number of changes to ensure complete dehydration. At no time, including the mounting stage, was the section allowed to come into contact with the atmosphere. *Fig.* 3 shows the same field as *Fig.* 2, with the air removed.

The section was again taken down to absolute alcohol and placed on the microscope stage. The alcohol was allowed to evaporate until air began to enter the spindles. *Fig.* 4 shows the stage at which no more air was permitted to enter, the section being immediately immersed in xylol and mounted in Canada balsam. An air bubble is seen in the lower part of the spindle on the left and one completely filling the spindle on the right.

Fig. 5 shows an enlargement of the area A–D in *Fig.* 1, in which a small air bubble has

Fig. 4.—Same, after replacement of air in different position.

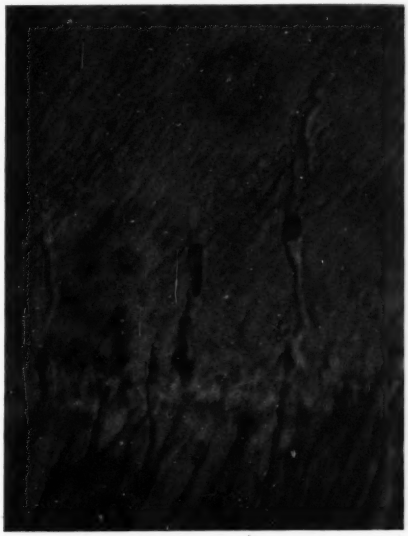

Fig. 5.—Higher magnification of area A–D in *Fig.* 1 after introduction of air bubbles.

been introduced into the large spindle and an additional bubble into the lower part of the smaller spindle. The air bubble in the upper part of this spindle was not removed during the first dehydration, as will be seen from *Fig.* 1.

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PARLIAMENTARY NEWS

THE MONOPOLIES COMMISSION

DR. DALTON (Lab., Bishop Auckland) initiating a debate on the Monopolies Commission, in the Commons on Wednesday, July 23, 1952, said the Dental Goods Order, made in July, 1951, forbade a number of most objectionable practices revealed in the report on the dental goods supply system.

On June 12 this year, the Minister of Health was only able to say he had received a copy of the revised rules of an Association of Dental Manufacturers and Traders, which was under consideration.

"Why is there this shameful tenderness towards this group of people who have been convicted by the Monopolies Commission on nearly all the things of which we suspected them?"

Mr. Peter Thorneycroft (President of the Board of Trade) replying, recalled that on dental goods the Commission's Report recommended an Order should be issued prohibiting exclusive dealing and collective boycott, and this was done. There were other matters the Report dealt with, recommending amendment of the rules, and the rules had been amended.

He thought it was particularly important that after the Reports, and action had been taken, a watch should be kept to see that the real intention of the Commission should be kept to. This was being done in cases where the Commission had made a report.

Mr. Anthony Crosland (Lab., Gloucestershire S.) recalled that an Order was made by the late Government, telling the dental industry that the practices of exclusive dealing and collective boycott were to cease. The Order was laid before the House last summer, he said, and he would like to hear a great deal more about this.

The point of the Order was to make sure independent firms in the industry would be able to get supplies. "My information, and that of other Members, is that it is still not possible for a number of smaller independent dealers in the industry to get their supplies.

"What appears to be happening", he continued, "is that although the Dental Association have 'scrubbed' their rules and said we have torn up these regulations, although they have torn them up apparently, there is no open and overt action but a gentlemanly collusion or whatever you like to call it."

It would be interesting to know whether the recommendation so far as prices were concerned had been carried out, he said.

Asked by Mr. William Robson-Brown (C., Esher) what he thought should be done on the question of the Dental Report, Mr. Crosland replied: "If my information is right, it is not working because you have got general collusion going on, even though the rules have been nominally torn up. If this is the case, I cannot pretend to be absolutely clear in my own mind what further action is needed except in regard to one point. You cannot possibly enforce this type of regulation without a larger enforcement body than we have in this country at the moment."

Mr. Robson-Brown said he was supporting what Mr. Crosland was saying. He hoped some reply would be forthcoming from the Ministry of Health.

It seemed clear, continued Mr. Crosland, that the enforcement provision in practice had failed in the case of dental goods. There must be some new action so far as enforcement was concerned. One obvious change was that the responsibility for enforcing recommendations of the Commission should be in the hands of

one department, and not as at the moment diffused through too many departments.

Capt. G. R. Chetwynd (Lab., Stockton-on-Tees) asked what had happened to the price of dental goods. This aspect had come in for "severe handling" in the Commission's Report. There had been delay in implementing the Order made last July, he said, and asked if there had been any significant change in the price of dental goods, which was something affecting national economy through the N.H.S.

Mr. John Edwards (Lab., Brighouse and Spenborough) said that in July, 1951, Mr. Hilary Marquand, then Minister of Health, made the Dental Goods Order and that industry then promised to revise the rules of their association.

But although a Board of Trade Report on the work of the Monopolies Commission, published in March this year, promised Government consultation with the industry to ensure that the guidance given by the Commission was reflected in the industry's trading practices, the Parliamentary Secretary to the Ministry disclosed on May 27 that no consultations had taken place.

In June Mr. Marquand was informed by the Ministry that revised rules had been submitted and were being considered. If the situation was not satisfactory, what were the Government going to do about it? Would they seek an injunction if they found that the Order was not being completely kept? There was an impression that nothing would have been done if Mr. Marquand had not followed up the work he started when he made the Order.

Mr. H. Strauss (Parliamentary Secretary, Board of Trade) replying, said Mr. Crosland had asked about the dental goods Order and whether it was now easier for independent firms to get supplies.

"My information", said Mr. Strauss, "is that it is. He asked if they could get if from four particular companies, and I think those four companies have themselves their own shops. I cannot tell him how far they are in a position to supply to newcomers. We have no evidence at all that they are disobeying the terms of the Order which the late Government made. Should there be any evidence of a breach of that Order, of course the necessary action would be taken." (*W., July* 23.)

THE ORAL HYGIENE SERVICE

THE Oral Hygiene Service was inaugurated at the Eastman Dental Hospital on July 17 and is believed to be the first public information service of its kind. The Chairman at the inauguration was Professor F. C. Wilkinson, Director of the Eastman Dental Hospital and Dean of the Institute of Dental Surgery. A statement of the objectives of the Oral Hygiene Service was made by Mr. S. G. Sweetman, Chairman of Messrs. D. & W. Gibbs Ltd., sponsors of the project.

The Service aims to make available information on all matters relating to oral health as well as to supply authoritative comments on the latest trends. It will also assist the dental profession by visual-aid material designed for schools and illustrated booklets prepared for distribution by dentists to their patients. All material issued will be approved by the British Society of Periodontology.

Dr. G. H. Leatherman, President of the British Society of Periodontology, speaking at the inauguration, said: "There is an appalling ignorance amongst the general public about the care of the mouth and teeth. It is a deplorable fact that many patients only visit the dentist when they require one or more extractions. Many people would prefer to have a tooth extracted rather than have it filled. The dental profession can do a great deal to stop wrong thinking, but we must have the help and interest of the patients themselves.

"I want to see a tooth-conscious nation. It is no idle dream. If one were able to care for the general and dental health of all expectant mothers and to supervise from birth the teeth of our children, one could be reasonably certain that a large percentage would reach middle-age with a healthy mouth containing natural teeth.

"There is no reason why we should not develop a nation in which people wearing dentures are an exception rather than the rule; and such figures as the supply of 14,000,000 dentures since the beginning of the National Health Service in 1948, and the extraction of 9,000,000 teeth in the last nine months of 1951 (compared with only 7,000,000 fillings in the same period) become impossibilities for the future.

"You will agree that we have a very long way to go in educating the public when I tell you that only 25,000,000 toothbrushes are sold in this country every year, and it is doubtful if very many of these are used properly."

ABSTRACTS
from Other Journals

A New Principle in Partial Design

The author outlines his proposals for constructing all partial dentures so as to be tooth-borne, thus producing mutual support for the remaining teeth of the natural dentition. This is achieved by covering the lingual and occlusal aspects of the natural teeth, so producing an increase in the vertical dimension equivalent to the thickness of the metal. This increase and the provision of an entirely artificial masticatory surface is said to produce no pathological changes.

Details of the impression taken by means of controlling the drag of composition are given, and this method is recommended. Attention is drawn to the absolute necessity of eliminating all marginal lesions before the insertion of any appliance.—FISH, E. W. (1952), *Brit. dent. J.*, **92**, 135.

Some Fallacies associated with Children's Dentistry

One does not have to be particularly fond of children to be a successful pedodontist. On the contrary, the work should be quite unemotional otherwise the operator's skill and judgement may be affected. A genuine desire to help them is required, together with confidence in one's ability to carry out the necessary treatment and to handle the special situation It is useless to try to distract the child with a fairy story in order to minimize the pain of cavity preparation, and the method used here is intra-osseous anæsthesia. The screamer who is completely unco-operative is subjected to the "towel technique" which is reputed to quell the child in three minutes or less. Souvenirs in the form of threepenny pieces are awarded for good behaviour. Copper amalgam appears to be the filling material of choice. The advantages of this material are depicted as: greater crushing strength; may be used usually without a lining; and absence of dimensional changes, unless it be a slight contraction. The lack of expansion accounts for the good reaction on the part of the tooth even when the fillings are not lined. That the lining acts as an insulator is said to be a fallacy. Using a properly ordered technique and discipline, children's dentistry can be as lucrative as adult dentistry.—LINDSAY, B., (1952), *Dent. J. Aust.*, **24**, *No.* 1–2, 14.

Occupational Bruxism and its Relation to Periodontal Disease

An interesting case is given and discussed of a 51-year-old farmer who presented complaining of "loose upper front teeth", in whom the medical history was negative and diet excellent. The teeth had become noticeably loosened about ten years prior to presentation and slowly progressed. Annual scaling and polishing and conservative treatment had been performed, and there was complete integrity of the arches except for absence of the maxillary third molars. Extreme difficulty was experienced in diagnosing the cause of the lesion until it was found that he was in the habit of driving a caterpillar-type tractor for a great many hours on most days of the year, and during the whole of this time he unconsciously clenched his teeth to prevent the constant jolting strain to the mandibular musculature. The amount of dust and other abrasive matter in the air leads to excessive occlusal wear, but if there is a marked anterior overbite, as there was in this case, a lesion in the periodontal tissues of the maxillary anterior teeth is liable to occur.

The case was treated by the fitting of a splint which increased the vertical dimension.—INGLE, J. I. (1952), *J. Periodont.*, **23**, 7.

Preparation of the Mouth for Cast Partial Dentures

It is emphasized that a partial denture should be a benefit to the patient and not merely an appliance to fill a few gaps in the jaw and at the same time quickly destroying the remaining dental tissues.

At the outset an accurate diagnosis of the state of the mouth must be made and the conservative work to the teeth and gums

completed. Doubtful teeth should be investigated if not removed and a diligent search made for sinuses and more obvious signs of buried roots and teeth.

In all but the simplest cases study models are required, and on these the denture is designed. It is well to see the jaws in occlusion before a decision to advise a denture is made. Some embarrassment will be saved the operator if he is sure beforehand that the teeth in the opposing jaw are not too far extruded from their sockets to make an efficient denture impossible.

The necessity for occlusal rests is stressed and in this connexion it is stated that one should not hesitate to remove with stones one half of the occlusal enamel, provided it is polished afterwards. This is the only way in which rests can be fitted when the teeth are in contact, if the occlusion is not to be upset. It is quite rightly pointed out that a naturally worn-away enamel surface does not decay any more rapidly than does unworn enamel, since it is as highly polished. Occlusal rests should be of adequate bulk to give strength and free of sharp angles to eliminate the possibility of food traps. A passing mention is made of clasps and it is presumed that a model surveyor will be used and again enamel may be removed if a strategic tooth is too bulbous for clasping. —SUTCLIFFE, D. G. (1952), *N.Z. dent. J.*, **48**, *No.* 231, 59.

A Concept of Occlusion in Periodontal Practice

The author states his views that trauma to the supporting tissues of the teeth is most frequently secondary in nature, and that the rationale for the correction of an occlusal disharmony is the prevention of this secondary damage. Tissues which have been affected by periodontal disturbances have a decreased adaptability to functional changes. He considers, therefore, that it is important to create the most favourable functional relation possible between the opposing teeth, by eliminating disharmonies not only between the centric and occlusal positions, but also in eccentric movements.—ORBAN, B. (1952), *J. Periodont.*, **23**, 38.

BOOK REVIEWS

THE GINGIVAL POCKET. By JENS WAERHAUG. Being Supplement 1, *Odontologisk Tidskrift*, 1952, **60**. Pp. 186. Oslo.

THIS work, which covers the author's investigations over a period of some eight years, is one of the most thorough and useful contributions to periodontology for many years. The investigations were commenced with the object of producing evidence for the contention that traumatic occlusion plays a dominant role in the causation of periodontitis. Some sixty-four sets of human jaws (autopsy material) were examined histologically, but although it was not possible to produce this evidence from this material, it was found possible to carry out investigations into the physiological and pathological gingival pocket.

The work is divided into four parts: Part 1 concerns the epithelial attachment; Part 2 the reaction of the pocket epithelium to various operations; Part 3 the relationship between calculus and both the bottom of the pocket and the alveolar crest; and Part 4 concerns re-attachment.

In the first part the author draws attention to the fact that the epithelial attachment was originally considered not to be organically attached to the enamel, and Mummery, even before Gottlieb, was probably the first to state that there was an actual organic attachment. The author was sceptical about this, and concludes as a result of certain experiments (passing a very thin steel blade, $1 \times \cdot 05$ mm., into the pocket) that there is no actual attachment to the enamel but rather an adherence. The degree of adherence was comparable to that of a glass cover-slip in contact with the inside of the lip. In all cases the blade passed to the enamel-cement junction. The force used to introduce the steel blade into the pocket varied between two and eight grammes.

The author found that certain factors during histological preparation were responsible for splits in the epithelium. These were movements of the gingivæ relative to the teeth after fixation and also after decalcification.

An examination of gold, porcelain, and acrylic crowns, the margins of which had been situated subgingivally, showed that epithelial cells would adhere to these with about the same degree of adhesion as the epithelial attachment to enamel.

As a consequence of his inability to demonstrate any organic union of the epithelium to the enamel, the author considers the term "epithelial attachment" to be a misnomer, and prefers that of "epithelial cuff".

In Part 2 he has investigated the reaction of certain foreign bodies in pockets. Following the introduction of Indian ink, it was found that there was first a transudation of fluid and emigration of leucocytes; this was followed by a breakdown of the pocket epithelium, and later by the leucocytes taking up the Indian ink, a proliferation of pocket epithelium, and an apparently normal epithelial attachment.

His investigation of teeth from which calculus had been removed, two or more weeks previously, showed that the area covered previously by calculus was now covered by epithelial cells. Although technically difficult, it was possible in favourable circumstances to obtain a pocket free from all irritants. The author maintains, in an article at present in the press, that pockets without irritants are sterile, and that bacteriological examination of pockets, according to his technique, should provide a criterion of success in the treatment of pockets.

During these histological examinations it was found that the average distance from the bottom of the calculus to the bottom of the pocket, where this was situated at the cement-enamel junction, was 1·52 mm., and the distance from the calculus to the alveolar bone 2·13 mm. Where the base of the pocket was below the cement-enamel junction, the base of the pocket was 1·16 mm. below the bottom of the calculus, and the crest of the alveolus 1·94 mm. below.

Where deepening of the pockets occurred, a decrease of the distance from the calculus to the base of the pocket, and an increase in distance from the gingival margin to calculus was found. All deposits, whether calcified or uncalcified, were termed "calculus".

In an examination of extracted teeth, it was found that the average distance from the calculus to the bottom of the pocket was significantly smaller where the pocket was below the cement-enamel junction all the way round. If calculus was more than 2·5 mm. away from the base of the pocket it was unlikely to cause further deepening in those cases where calculus had been the cause of the original pocket.

The author postulates that the toxic effects of infected calculus gives rise to chronic gingivitis, and that this inflammation causes decomposition of the periodontal fibres.

In Part 4 the author considers the problems of re-attachments. He carried out experiments in dogs and humans, and he found that in those dogs where traces of the periodontal membrane were left, in 13 out of 21 complete re-attachment occurred—this was demonstrated by means of Indian ink. In those cases where pockets had been made, periodontal membrane left, and bur marks made, re-attachment occurred in both the successful cases. In a further group of cases where pockets were made, all the periodontal membrane and cementum was removed. It was found that some cementum was left owing to the technical difficulties of removal, and that re-attachment occurred in 13 out of 28, and that this was only partial in 4 out of 13. Secondary cementum was formed in 5 cases.

In a further group of experiments in which the pocket epithelium was removed by curettage, the findings were that after two or more days all epithelium lining the gingivæ was replaced, and that by eleven days it was histologically normal.

Finally, in cases where curettage had been carried out in humans, re-attachment with new cementum occurred in only 4 cases out of 32.

The author concluded that in general curettage is not, at present, a practicable proposition.

Issued with "The Dental Practitioner", September, 1952, Vol. III, No. 1

RADIOGRAPHIC CHART No. 4. (FOR YOUR PATIENT'S INSTRUCTION)

RADIOGRAPHIC EVIDENCE OF APICAL INFECTION

A

B

A, Darkened area at apex of mesial root of lower first molar gives evidence of infection. This tooth is dead and was giving rise to considerable pain.

B, Apical infection at apex of dead upper first premolar. Gave rise to slight pain over a long period of time.

Both these teeth were extracted as the possibility of root treatment was impracticable.

The work is well produced, and illustrated with eight diagrams, sixty-nine photomicrographs, and fourteen colour photomicrographs. These are all of a high standard. There are about one hundred references to the literature.

A small number of grammatical and typographical errors is present. Further, for a work produced in English, it would be preferable to have teeth designated by the dental grid used in the English literature, instead of the ± system; but these are minor criticisms, however, and this is a work which is of great value to the periodontist, and it can be thoroughly recommended to all who are interested in the supporting tissues of the teeth, while to those who teach Periodontia it will be essential. W. G. C.

JUVENILE DENTISTRY. By WALTER C. MCBRIDE, D.D.S., F.A.C.D., Detroit. With special chapters by JAMES NUCKOLLS, C. TAYLOR HALL, DOROTHEA RADUSCH, and HAROLD V. DWYER. Fifth edition. 6 × 9 in. Pp. 370, with 302 illustrations. 1952. London: Henry Kimpton. 50s.

THIS fifth edition is disappointing. It appears to be essentially the fourth edition revised only in minor degrees and re-arranged.

There is little doubt Dr. McBride writes with the backing of considerable clinical experience, and the book contains a great deal of very useful information. The difficulty, however, is to find this information easily without first reading through a considerable amount of general statement, much of which would appear to be inadequately supported. For instance, on page 304 in the section dealing with "local causes of malocclusion", he quotes from someone else's intensive study of 38 cases. In view of his own personal experience one feels it a pity that a much larger selection of cases from his own case histories was not used as a basis for comment.

The section dealing with morphology of deciduous teeth formed the last chapter in the fourth edition, but has now been moved to become Chapter IV. The chapter is tedious and fails to comply with Dr. McBride's principles as he states them in the Preface to the fifth edition.

The section on physical diagnosis by a contributor to the book has been enlarged, but remains unsatisfying as a general medical background to dentistry for children. One is left with the impression that it is detached from the main subject-matter of the book.

If this publication is to be used as a text-book for undergraduates then it is felt that too great an emphasis has been placed on the business side of dentistry, and that the section dealing with conservative procedures should be more in line with present-day views. If it is for post-graduate study then certain sections, of use only to the undergraduate, should have been omitted. In general the impression is that the book, like its predecessor, falls between two stools.

A. M. H.

INSTITUTE OF BRITISH SURGICAL TECHNICIANS (INC.)
(Dental Section)

A LECTURE will be given by Mr. R. D. G. Gain, L.D.S. R.C.S., on "Obturators" on Tuesday, October 21, 1952, at 6.30 p.m., at the Eastman Dental Hospital, Gray's Inn Road, London, W.C.1.

Admission tickets are obtainable on sending stamped addressed envelope to the Institute of British Surgical Technicians, 6, Holborn Viaduct, London, E.C.1, or through members of the Institute.

DENTAL RADIOGRAPHY

THE Ilford Ltd. Department of Radiography and Medical Photography, Tavistock House North, Tavistock Square, London, W.C.1., will hold two courses in dental radiography and darkroom procedure, the initial course on Thursday and Friday, September 18 and 19, and a second course for nurses who have already attended the first course, on Thursday, September 25. Attendance is from 10 a.m. to 4.30 p.m. each day and a programme can be obtained on application. No fee is charged for either course.

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Vol. II, No. 6 September, 1952

Editorial Committee: D. M. BEAUCHAMP; H. J. POTTER, F.I.B.S.T.

EDITORIAL

LONDON, unique all ways, for one week was the world focus of all that dentistry comprises, on the occasion of the Eleventh International Dental Congress.

We salute those British dental surgeons who with commendable foresight booked the Royal Festival Hall as soon as the foundation stone was laid in 1947, and those who afterwards carried the responsibility of ordering such an immense undertaking.

We are proud of the many features of dental activity; of the innumerable scientific exhibits of matchless coloured transparencies, and endless life-size models of dental disease and deformity; of the international Brains Trust in the auditorium, with Congress President, Dr. E. W. Fish, as question master, and the team members from Sweden, Canada, Switzerland, France, America, and Britain; of the wonder of the televised projection of actual operations on to a full-sized screen, which was matched by the capability of those surgeons and demonstrators who under great difficulty courageously and confidently displayed the use and value of this latest teaching aid; of the two hundred and eighty table demonstrations spread over five days; of the comprehensive trade exhibition and all the other attractions lodged in the fine edifice on its commanding South Bank site.

We congratulate our British dental surgeons on the undoubted success of their Congress, and join in the praise the organizers richly deserve.

Our own association made its contribution by entertaining the president of the N.A.D.L. of America, and Mr. Duncan Marshall, a supporting laboratory owner from Detroit.

It is time we in Europe began to get together; might we not explore the possibility of an international gathering of ethical laboratory men, say in Brussels in 1956?

THE SUMMER CONFERENCE

Held at The Holborn Restaurant, Saturday, July 19, 1952

Mr. E. G. Emmett, our National Chairman, presided over the proceedings of the day. In opening the morning session he welcomed all those present and indicated that the conference was divided into three parts, to be chaired by Mr. Alex. J. Grant in the morning, Mr. R. Mather at luncheon, and by himself at the film show in the afternoon.

Mr. Grant then proceeded to introduce the guest speaker, Mr. R. J. Rothstein, President of the National Association of Dental Laboratories of the United States, who was welcomed with acclamation.

As space is limited we have had to shorten our report of the speech, but much, however, has been included verbatim.

Mr. R. J. Rothstein: Ladies and Gentlemen, to me it is a privilege to be here with you this morning.

I bring you greetings from the laboratories of America in my official position of President of the National Association of Dental Laboratories of the United States.

After I had started making my plans, our National Association of Dental Laboratories passed a resolution to the effect that I should officially represent the laboratories of the United States at this meeting.

I have looked forward with a great deal of enthusiasm to my visit here and hope my message will be received in the friendly spirit which prompts me to deliver it.

The subject assigned to me is:

LABORATORY ACTIVITIES AND LABORATORY CONDITIONS IN THE U.S.A.

I have seen dentistry and dental laboratories from every angle and cannot help but emphasize the fact that dentistry has made real progress in the last half century. Dentistry to-day in America is enjoying the most scientific development in its entire history, and I am convinced that the dental laboratory man—the dental technician—has contributed a great deal, not only economically, but scientifically as well.

We laboratory men in America are an ambitious group of individuals. We have come to realize that we do play an important role in the over-all picture of dentistry, but we want to emphasize the fact that we know our limitations. We know our lines of demarcation, we ethical dental laboratory men in the United States, and I say ethical, as we have the respect of all ethical members of the dental profession in America. We want to and insist that we serve the dental profession only. We, who have made the dental laboratory our life's work, want to continue on a strictly ethical basis. We want to serve the dental profession, we want to respect the dental profession, but we demand the same respect.

It is through the encouragement of organized dentistry that to-day in the United States, for the first time in our history, the ethical dental laboratory men are all thinking alike.

We have come to realize that we have grown up, our problems are the same. We want, and expect, the good things in life, such as any individual, regardless of his vocation. We want to conduct our service in a manner that will create respect and integrity to our craft. Our slogan is how can we best serve our customer, the dental profession—to earn that which we seek.

To-day, in the United States, approximately 90 per cent of prosthetic appliances are processed by the industrial dental laboratory. This in itself is an indication of the important role the dental laboratory plays in dentistry.

I am endeavouring to give you the picture as it exists in our country. I know that the possible set-up here in England may not lend itself to the existing programme in the United States.

But before I finish my talk to you to-day, I hope to leave with you some thought for future planning.

The laboratory man in the United States was never in a better position.

Organized dentistry welcomes frequent meetings with our laboratories.

We have both found that if we understand one another's problems the road to mutual co-operation is really simplified.

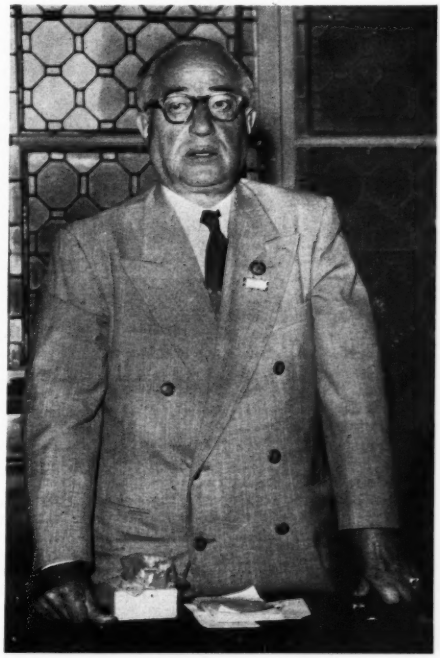
At many of our State Laboratory meetings, oftentimes members of the dental profession who are leaders in the prosthetic field put on very interesting clinics for the laboratory men.

This is an illustration of how closely the laboratory men and the dental profession work together for the common good.

In many States, the dental societies invite the laboratory men to their meetings whenever there is a lecture or clinic on dental prostheses.

This gives the technicians first-hand information on important developments in prosthetics and helps considerably.

Many contributions to dentistry have been made by the dental laboratory man; the one-piece casting of partial dentures was developed by a personal friend of mine. (We worked for nine years alongside one another.)



Mr. R. J. Rothstein delivering his speech.

The chrome cobalt partial restoration has revolutionized the partial denture field. Where formerly the metal partial was out of reach of the average patient, to-day partial dentures made of chrome metals are within reach of a majority of patients.

To-day, in America, metal partials play an important role in the prosthetic field.

Dental laboratories have helped a great deal in servicing patients through the dentist, enabling the dentist to see more patients instead of the dentist devoting a lot of time to prosthetics.

The modern dental laboratory in America is a far cry from yester-year. To-day we have laboratories that would

be a credit to any modern industry—the finest equipment—the best sanitary conditions—modern working conditions.

Most laboratories work 5 8-hour days—no work on Saturday or Sunday.

Most laboratories carry all types of insurance to protect the health and well-being of the technicians.

Every inducement is made to encourage the trained technician to stay on with the laboratory, for we have learned that, if it is necessary to keep changing personnel, you cannot put out uniformity of service to the dental profession.

Many of our far-sighted dental laboratory operators realize if we intend to build for the future we must pool our efforts—we must develop a programme indicating a real effort to educate the rank-and-file laboratories. We have learned, the better informed—the more accomplished.

* * *

One of our drawbacks in the past several years has been caused by lack of unity in our craft. After much effort we finally succeeded in creating unity and now there is in existence a National Association of Dental Laboratories, of which yours truly has the honour of being the first president.

The National Association of Dental Laboratories was born in February, 1951, in Chicago, Ill.

Previous to that, there were three different factions working independently, and, at this particular meeting, these three factions realized we were all confronted with the same problems. It was clearly established that all of us had the same ambition and that was UNITY in our industry. The result was that before the meeting was over there was definitely established one national association of dental laboratories.

At our Charter Meeting held in Chicago in 1951, 31 States were represented in the first "unity" meeting, even though all of those 31 states did not have active and functioning state dental laboratory organizations, and the aims of the association were established.

When this was written, 42 States were active contributing members of the National Association of Dental Laboratories, and by the time the 1952 House of Delegates convenes in Kansas City in October, there are expected to be at least 45 States or territories actively chartered, practically the entire country. Some States are too small to have a State Association and in such cases we are going to have these small units linked up with some of the States close by, so that all laboratories will have an opportunity of finding out what is going on.

Aims of the Association.—

1. Adequate Washington representation because Washington is the scene of all legislative action on a national scale.
2. Encouragement and development of educational programmes in the field of dental laboratory technology.
3. The establishment of a programme of public relations within the field of dentistry.
4. Establishment of a National Dental Laboratory magazine and such other programmes as may benefit the field of dental technology.
5. National Dental Laboratory Congress that will give the manufacturers an opportunity to display their wares, give us an opportunity to get together, and possibly develop a revenue to help support our National Association.
6. Improvement of professional–laboratory relations.
7. The subject of materials, man power, and service to the Armed Forces through Government liaison.
8. Better trade practices and relations.
9. Compilation of statistics showing the business trends.
10. Research and education.
11. Improvement of industrial relations.
12. Establishment of uniform accounting records.
13. Promotion of efficiency in production and distribution through technical research.
14. Development of high standards of business conduct and elimination of unethical practices.
15. Decontrol of laboratory prices on a national level. (As I understand from talking to Mr. Emmett, that is reversed here in England. The laboratories are not controlled and the dental profession is controlled, whereas in the States it is the other way round, the laboratories are controlled and the profession is not controlled, so we are making an effort now to decontrol the prices in our craft and I say, Ladies and Gentlemen, that if we had had a national association then, as we have now, we would never have been under this control. I feel the set-up is wrong because we did not have proper representation when this was introduced.)

Committees.—My first official duty was to appoint my Committees. There are 12 Committees with 74 men serving: By-laws; Legislation; Government liaison; Education; Membership; Annual meeting; Professional relations; Trade relations; Research and material standards; Publicity; and Ethics.

Other Committees are in process of being appointed:—

1. An *Emergency Committee* for three years' duration to study the economic situation in the dental laboratory craft and to present its findings to the Federal Commission in an effort to formulate a Code of Fair Practice.
2. A *Library Committee* to study and complete the gathering of an N.A.D.L. Library to be set up for use of the State components. This should be a long-range programme of at least three years.

Joint Meeting.—On February 5, 1952, in Chicago, Illinois, at the American Dental Association headquarters we had a meeting of officers and members of the Dental Trade Laboratory Relations Committee of A.D.A. and the National Association of Dental Laboratories.

Dr. Herbine, Chairman of the Dental Group, in his opening remarks said: "This day is a historic one in dentistry. For the first time we are holding a meeting of both the dental profession and dental laboratories, where ethical dentistry and ethical dental laboratories are officially represented".

(It shows the importance of that gathering and I feel that Dr. Herbine has sounded a good note for a constructive programme in the future.)

The items of business taken up at this meeting were:

Official Recognition of N.A.D.L.

Training of Dental Laboratory Technicians: This is a very important item in the States. During the first world war there were several trade schools developed throughout the country. At that time I came to the conclusion that these schools served no purpose. They were an expense to the taxpayer and produced little result. During the second world war, I contacted the officials at Washington to try and ward off the same conditions, but for some reason or other, after spending a day with this group, they went off on the same programme and in America to-day the Government is spending millions of dollars on what is supposed to be the education of dental technicians. In Washington alone there are 300 students graduating yearly when there are possibly only 50 or 60

dentists graduating. There is also a trade school in Philadelphia on a much larger scale, and before long we shall have more technicians than dentists and dentistry itself will suffer. Again I say that had we had our National Association established when this law was written we could have controlled that. It was not the dentists' fault; it was not their problem, it was ours. They had representation and we had not, and we are paying for it to-day and dentistry will pay as time goes on. That is the reason we established a definite procedure in attempting to handle the training of dental technicians, which we feel is done best through apprentice training in the dental laboratories.

Liaison between Schools and Dental Laboratories.

Legislation regulating Dental Laboratories and Dental Laboratory Technicians. Dental Laboratory Technicians and the Armed Forces: During the first world war dental technicians were drafted and placed in the infantry and other branches of the Armed Forces, but in the second world war we had something of an organization. I happened to be Chairman of the War Services of America in that period and we placed many boys who were put into the services together in laboratories. To-day we have that strictly controlled. If one of our boys is being drafted and he has a dental technician's training, if he applies to the Home Office in Washington he will be placed in a dental laboratory. To me that is a very vital step.

Efforts to obtain Proper Ratings for Dental Technicians in the Armed Forces: Then we made an effort to obtain proper training for technicians in the Armed Forces. During the second world war we had special meetings with the powers-that-be in the Armed Forces and we felt that technicians were not getting proper training and that some were capable of conducting dental laboratories probably far more efficiently than any dentist, with due respect to the dental profession. I feel that we in the laboratory business know it—we do not fear the dentist and in that particular area if it comes to a dental laboratory question I am happy to tackle it with any dentist here or in the States. It is our life work and we know the dental laboratory business and in a dental laboratory question we laboratory men are certainly in a better position to answer questions relating to dental laboratories and their activities. If some inducement was offered to our technicians with some sort of training they could evolve a good service to the Armed Forces at little cost and at less cost than having commissioned officers, and more efficient results would be had. This is now a fact and for the first time in history we do have commissioned technicians in the dental laboratories both in the Army and Navy.

Dentists operating Commercial Dental Laboratories.

Mutual Liaison with Government Agencies: Where we had a problem to face heretofore, we had to go through the dentists, now we can go direct. That was agreed at our joint meeting.

Mutual Exchange of Information.

Subscription to the A.D.A. Journal by Laboratory Men.

Membership of State Society Liaison Committee: It was recommended that the State Society in appointing dentists on their laboratory relationship committee select only those men who have dealings with dental laboratories and know the function of dental laboratories. (Heretofore you will find that in every State in the Union on these Committees were men who specialized in orthodontics, etc., and tried to make a reputation, at the expense of the laboratory and I insisted that it be recommended to the State Societies that they appoint dentists who are familiar with the dental laboratories. This was well received and it was recommended to State Societies that dentists should be appointed who know our functions and to a certain extent our problems and can discuss them with mutual advantage.)

* * *

Various Government agencies are interested in our programme.

During the past year, as President of our Association, I have had occasion to visit almost every section of our country.

In some areas I found deplorable conditions. That is why I decided to appoint an Economic Research Committee to study the situation and make recommendations

Members on the platform applauding Mr. Rothstein at the Summer Conference.

Reading left to right: F. E. Martin (London), H. J. Potter (Luton), F. Pearson (Bradford), W. G. Kenyon (Manchester), Mrs. and Mr. Rothstein, A. J. Grant (Brighton), E. G. Emmett (London), J. L. Jacobs (London).

to help alleviate existing conditions in those areas that need help. (It is deplorable to think that in some areas in the United States no effort seems to be made by the laboratory men, either through lack of ambition or understanding, to better their conditions. I feel that the Economic Research Committee we have appointed is going to do a beautiful job in striving to build up confidence and integrity in the areas that need this build-up.)

I have found the laboratory problems are the same regardless of location.

In some areas the progressive leaders, due to their activity, have improved their positions, while in some localities there seems to be a lack of leadership, resulting in very little progress. (That applies to all sections of the world. You must have a few men to lead and they should be supported by a group—you must have a strong organization, without it you cannot hope to accomplish anything. The very first thing you must do is to have yourself organized, develop a clear understanding among

you, build up confidence in one another, appoint your committee, and support that committee.)

* * *

The laboratory craft in the U.S. is now on the threshold of a new era. Much is and must be accomplished. The way is paved for a clear understanding for a progressive programme in our efforts to improve our position, and at the same time serve the dental profession with more efficiency.

* * *

There is a great need for laboratory education in our country.

1. The question of sound business procedure.
2. The importance of meeting fellow laboratory men.
3. The imperative need for sound State and National Dental Laboratory Associations.

(And that, Ladies and Gentlemen, is one of the messages I want to bring here. I have no idea how strongly you are organized. I have no idea of how many times you meet, but I say to you that if you want to make any progress, and I am talking now to laboratory operators, as I understand there are a few technicians here, if you want to make any progress in your field of endeavour, you must be unified, you must get together, you must concentrate your efforts and abilities and work along a narrow channel in a proper direction. There is a lot at stake and a lot to be accomplished.)

The question is often asked: Why do people join a trade association? They do so because:

(1) They believe in the Association and its objective. (2) They use the services of the organization. (3) They like to attend meetings. (4) They appreciate contacts and companionship. (5) Their friends belong. (6) They seek personal preference and recognition. (7) They want to keep informed on trade matters. (8) There are educational advantages to themselves and their employees. (9) They want to improve the industry. (10) They want to improve the business methods and efficiency of their plants. (11) It is a defence against unfair legislation and taxation. (12) There are social and recreational features. (13) They want to work with competitors on mutual problems. (14) By being properly organized, they can help the country in any emergency without a large waste of time and money.

There are many more important reasons why the dental laboratory craft should have a national association:—

1. The dental laboratory craft is young and raw. It *must* grow through planned programmes of education, internal public relations programmes, and programmes that will develop recognition for the craft itself.

2. Only through national unity and pooling of resources can the important techniques, skills, and experience be standardized, developed, and the knowledge of these be disseminated throughout the craft.

3. A central and unified body is vital to help the dental laboratory craft in gaining recognition by governmental agencies and legislative bodies and in filtering such information to the State components and their individual members.

4. A strong national association is absolutely necessary in order to develop confidence and understanding within the craft and between the craft and the profession.

* * *

A statement made by Mr. Harper Sibley, of the American Trade Association, is as follows: "As Americans, we are proud of the industries of which we are a part, and to which we give the best that is in us. It is an act of loyalty and patriotism for us to do our part in our trade associations and contribute our efforts to make these associations most effective for their proper purposes."

The Price Problem.—

1. No Trade Association ever discusses prices. (I am talking now about our State situation. It may be a little different here, but I am talking now about the position as it exists in America.)

2. "Reasonable Returns" come into an industry when that industry becomes sound in its operations and when the element of mistrust is eliminated.

3. Prices within the craft are weak because these are based on some kind of "follow-the-leader" psychology instead of understanding of the economics.

(I would like to pause here and give you a little more information on that important phase. In my travels throughout the United States I have learnt time and time again that the average laboratory man never sits down and tries to analyse his costs. He takes the list of another laboratory man and uses it as a guide, and charges possibly the same or in most cases a little less. But the leader in each community is the man who sets the price scale. He cannot be bothered by the other laboratories. He knows his costs of operation if he is a going business, paying his way, using proper overheads, and leaving a reasonable margin of profit. It must be summed up in the same column and he must then ask himself "How much can I charge?" When he reaches a conclusion he makes up his mind he wants 6 per cent profit and works on that basis. I am talking about the business-like laboratory. Possibly that position exists here as well and it is something of which to take heed. If the large operator is going to put a low price on an item, every laboratory will follow suit or make it lower. If the large laboratory man sets his price on a scale which will allow him to make a normal living and put a little by for a rainy day he will find that other laboratories will follow suit. I am not here to tell you to raise your prices. I am here in the interests of laboratory men. I mentioned before I came here I would be happy to have any member of the British Dental Association at this meeting. I made the same remarks in the United States. I am trying to give you fundamental facts, not attempting to try and raise your prices to the dental profession, but I feel you are entitled to a fair living.)

4. The tendency towards "cut" and "lower" price levels must be educated out of the craft or we live in danger of economic suicide for lack of new blood entering our industry because of this situation. (I have found in my travels the same problem in every State in the Union to-day, especially when salaries are so high because the cost of living is so high. Our prices are frozen and salaries are frozen. We cannot raise our salaries or our prices. The result is we are losing some of our best trained technicians. A man who had been with me for 10 years could not afford to get along on his salary but he could get 75 or 50 per cent more in another field. That is the situation that is facing us to-day and on that basis we are trying to decontrol our prices because I feel that if we lose our best technicians, dentistry will suffer and eventually the public health will be impaired.)

I have learned that if your product is acceptable to the profession, you can and will establish confidence with your customer, the dentist, and he will support you. (That is giving you the facts as we find them in America. Some dentists are price-minded and we cannot do anything about it, but if you aim at serving the dentist on a better scale you will eventually find your ceiling. You will be in a much better position and you will have a closer

friend in the dental profession. I am speaking of the conscientious dentist who wants to give the patient the best that money can buy.)

By frequent meetings with competitors, respect and confidence in each other will develop, thus paving the way for a better understanding of seemingly complicated problems.

A statement made by Newbold C. Goin on Industrial and Business Co-operation through Technical and Trade Associations: "Co-operative action of the type that can be obtained through Associations is the only legitimate manner in which a group of competitors can make a common case of those things that are of interest to the industry of which they are a part. It is because of this that the so-called Trade Association Movement has expanded as much as it has in the last 20 years."

Dentistry has become "big business" in America and the dental laboratory craft is an important "supplier" to that business.

In 1951 we had a billion dollars' worth of dentistry in the United States and laboratory men enjoyed 223 millions of business. Of the 6700 laboratories in the United States, 3000 of these are members of our Association and it is less than a year old. Now there is no doubt in my mind that, as in the States, there are a number of small operators here and I want you to know that I have the respect of the small laboratories as well as the large ones. I personally operate a large laboratory, but 75 per cent of the laboratories in America are small units. If we are to have a national association, recognized by the Government and A.D.A., we must have all the units in it and we are aiming for that. We have a lot of problems common to the small operators, but we are all laboratory operators. Some cannot help themselves but the progressive man who has built his laboratory on a business basis and has seen fit to conduct his laboratory on a business basis will go ahead and time plays an important element. Mr. Marshall, present here this morning, is one of the important laboratory operators in Detroit and has contributed much to the uplift of our industry.

Small Business.—

It is a known fact that small business has more to gain from a Trade Association than large business. Why?

Big Business, on its own, can hire its own market analysts; big business has its own legal adviser so as to keep informed on Government regulations and numerous other problems the business man is faced with to-day. Big business can hire men for research and there are many other advantages. *Small Business* cannot afford such useful services, *but* by being a member of the N.A.D.L. these, and many other services are provided—for all laboratories—small and large alike. The cost is small, as it is spread all over the country. The small laboratory, by joining its National Association, gets the best advice in the field. The cost is small; the advantages are incomparable. Most of you, I am sure, carry various types of insurance. How many of you realize that Business Insurance is of paramount importance? I might add here that travelling in London all I see are banks and insurance companies and I wonder where all the money comes from and I want someone to explain why some of these banks and insurance companies do not amalgamate to cut down expenses a little. How many of you realize that the financing of your business is an important part of your existence? How many of you carry the so-called Business Insurance? By being wholeheartedly connected with an Association to guide you, you have that so-called Insurance.

Why do successful business men travel thousands of miles—take time out from their businesses—to attend trade meetings? The modern business man has learned that there is more to be gained by exchanging ideas than by hiding them. (In the United States the lady dental assistants are organized in every State in the Union. They are recognized by the A.D.A.—they are doing a beautiful job—they have a beautiful publication and they are doing a remarkable job of work. Dental hygienists are another group who are well organized—they have the respect of the profession and are doing a beautiful job. I am hoping the laboratory men will follow suit.)

Any man making a living in any industry should take enough pride in his particular field to help to make it a better industry in which to live.

As Teddy Roosevelt said: "Every man owes some part of his time to the building of the industry or profession of which he is a part".

I heard an expression some time ago, "He who fails to prepare, simply prepares to fail".

Men who are interested in seeing progress made must make a sacrifice. Some must be leaders. EFFORT—MONEY IS NEEDED. The ethical dental laboratory man has nothing to hide.

We want to preserve our life's work—we want to add integrity to our craft—we want to be proud of our Association and accomplishments. We want our children to feel the same way.

Thus far, I have given you a short résumé of the birth of the dental laboratory craft in the U.S.A.

I have attempted to give you the story as to the progress made over a period of years.

I have also attempted to show you the importance of the Association of Dental Laboratories on local, state, and national levels.

If we in America intend to maintain our position as a progressive adjunct to the dental profession, we must develop a long-range programme so that our craft will keep pace with the progress of dentistry.

We laboratory men in America realize we cannot sit idly by while dentistry itself continues to march forward scientifically and otherwise.

We feel it is mandatory to have a sound National Association of Dental Laboratories to discuss problems as they come up and help solve those problems for the good of our members, as well as respecting our responsibility to the dental profession.

Our National Association of Dental Laboratories invites all ethical dental laboratories, large and small alike, to participate in our programme.

At this present time there are approximately 3000 members participating. We feel that as our programme continues, more laboratory men will be anxious to become associated with us.

A few years ago, your Dr. Roper Hall, from England, was visiting Washington, D.C.

Our local dental society sponsored a dinner party in his honour, to which I had the pleasure of being invited. Dr. Hall gave us a very interesting talk that evening on dentistry in the British Isles.

After the meeting, Dr. Hall paid us a visit to our laboratory. He appeared to be very interested in our aetivities.

If in this presentation I have brought to your attention information of any value, or given you any worthwhile ideas for you to consider for the betterment of the dental laboratory craft in England, then I feel that my mission here has been accomplished.

My itinerary schedules me to travel throughout the Continent, where I expect to make many additional contacts among the dental laboratories, and hope to bring back to the United States some interesting facts, as they relate to the dental laboratory, as well as the relationship between laboratories and the dental profession.

I have had an active year in the United States since I was chosen as President of the N.A.D.L.

I have enjoyed the work, and when I return to the United States in September, I shall proceed to Kansas City, Missouri, to make a report of the activities during my administration.

I hope also to include a report of my visit to Europe. It will be a happy termination of a full year of action and development.

I feel our industry has gone a long way in the last twelve months.

It is an interesting way of relinquishing not only my office as President of the N.A.D.L., but also my active participation in my own organization.

I feel that after fifty-three years of constant service to the dental profession, I am entitled to spend my remaining days leisurely.

I have a young son whose college major was Business Administration. He is to be my successor in the Rothstein Dental Laboratories organization, where we employ approximately 150 people.

I also have another son, a successful practising dentist, so you see I have carefully planned my programme and hope to perpetuate the name of Rothstein in dentistry.

I sincerely appreciate the invitation to appear before you. It is a great source of pleasure to be here in London again after thirty-nine years, where I spent part of my honeymoon here in this city.

A lot of water has gone over the dam since then. First I am the proud father of three children and am blessed with five grandchildren. The world has been torn apart by two dreadful wars and the present situation does not look too good. Let us pray that we will not have to face another war.

If any of you gentlemen should travel to the United States at any time, be sure to visit Washington, D.C., my home. The door latch is always open.

It is a pleasure to be with you. I have enjoyed the meeting and God bless you with your accomplishments.

At this point Mr. Grant gave permission for questions, but it is necessary to hold over the reporting of these, together with the account of the luncheon and film display, until next month.

TELEVISED OPERATION

DELEGATES from all over the world, attending the XIth International Dental Conference in London last week, saw an operation televised and projected on to a large screen—the first time this technique has been employed in a British hospital.

A Marconi Image Orthicon Television Camera was mounted above the operating

table and larger-than-life close-up details of a cleft-palate operation were seen by large numbers of the delegates in the viewing theatre five floors below.

The equipment used for this television demonstration was designed and manufactured by Marconi's Wireless Telegraph Co. Ltd.

S.I.M.A. (DENTAL LABORATORIES SECTION) DIARY

Croydon (*Secretary* : Mr. H. J. Nowers, F.I.B.S.T., 86, Croydon Road, Croydon).—Meeting, September 19, 1952, at the Six Bells, Croydon. Table Demonstrations, October 24, 1952, at Norbury Library.

South-Western (*Secretary* : Mr. W. H. Horn, 10, Criterion Place, Exmouth).—Meeting, September 2, 1952, at Newton Abbott, Devonshire.

South Wales and Monmouthshire (*Secretary*: Mr. R. Mather, F.I.B.S.T., 16, Clodien Avenue, Gabalfa, Cardiff).—Meetings, Thursdays, September 4 and October 2, 1952, at the Royal Hotel, Cardiff.